ORDER NO. KM49609089C1
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Service Manual

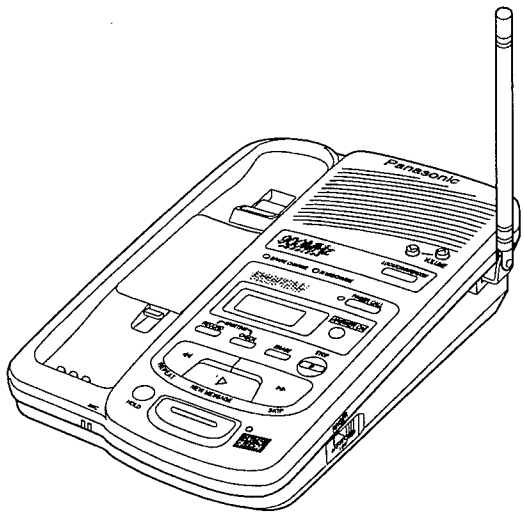
and Technical Guide

900MHz Cordless
Answering System

Telephone Equipment

KX-TCM940-B

(for U.S.A.)



(Model KX-TCM940H-B)

(Model KX-TCM940R-B)

■ SPECIFICATIONS

	Base Unit (KX-TCM940H-B)	Portable Handset (KX-TCM940R-B)
Power Source:	AC Adaptor (KX-A11-6)	Rechargeable Ni - Cd battery
Receiving Frequency:	30 channels within 926.1~927.55 MHz	30 channels within 902.1~903.55 MHz
Receiving Method:	Double super heterodyne	Double super heterodyne
Transmitting Frequency:	30 channels within 902.1~903.55 MHz	30 channels within 926.1~927.55 MHz
Oscillation Method:	PLL synthesizer	PLL synthesizer
Detecting Method:	Quadrature Discriminator	Quadrature Discriminator
Tolerance of OSC Frequency:	±3.6 kHz	±3.6 kHz
Modulation Method:	F3 (frequency modulation)	F3 (frequency modulation)
ID Code:	20-bit	20-bit
Greeting Message and Incoming Message:	Full digital recording Total recording time, 15 minutes	
Dial Mode:		Tone (DTMF)/Pulse
Redial:		Up to 30 digits
Save:		Up to 30 digits
Power Consumption:		14 days at Standby, 4.5 hours at Talk
Dimension (H×W×D):	$2^{11}/_{32}$"×$6^{11}/_{32}$"×$8^{1}/_{4}$" (60×161×210 mm)	$10^{1}/_{4}$"×$2^{8}/_{16}$"×$1^{9}/_{16}$" (260×56×40 mm)
Weight	1.36 lbs. (619 g) with spare battery	0.47 lbs. (214g) with battery

Design and specifications are subject to change without notice.

Panasonic

KX-TCM940-B

⚠ WARNING

This service information is designed for experienced repair technicians only and is not designed for use by the general public.
It does not contain warnings or cautions to advise non-technical individuals of potential dangers in attempting to service a product.
Products powered by electricity should be serviced or repaired only by experienced professional technicians. Any attempt to service or repair the product or products dealt with in this service information by anyone else could result in serious injury or death.

When you mention the serial number, write down all 11 digits. The serial number may be found on the label affixed to the bottom of the unit.

TABLE OF CONTENTS

STANDARD BATTERY LIFE

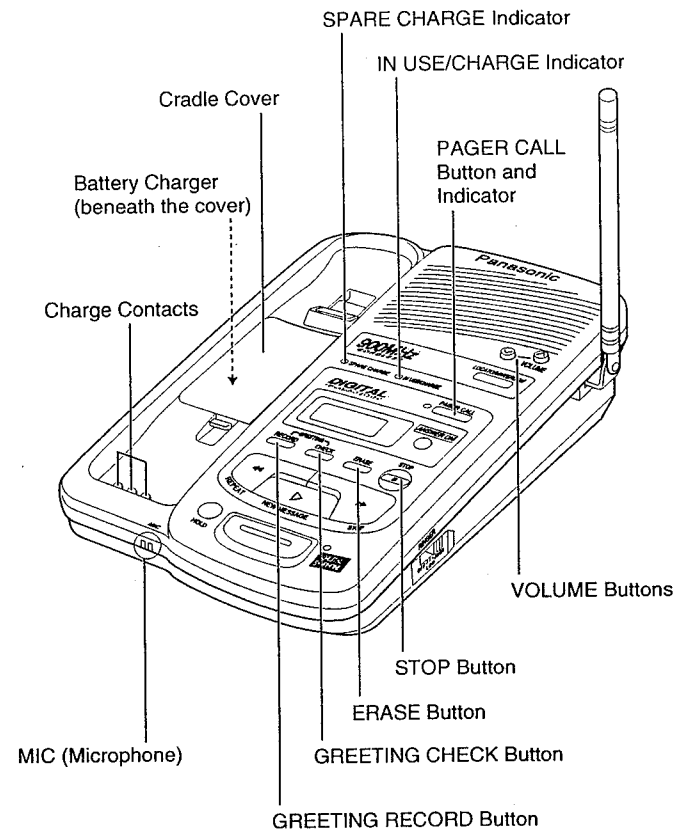
If your Panasonic battery is fully charged;

While in use (TALK)	Up to about 4.5 hours
While not in use (Stand-By)	Up to about 14 days

- Battery life may vary depending on usage conditions and ambient temperature.
- **Clean the charge contacts with a soft cloth once a month**, or the battery may not charge properly.
- Once the battery is fully charged, you do not have to place the handset on the base unit until the TALK/BATT LOW/PROG indicator flashes slowly.
- The battery cannot be overcharged.
- USE ONLY Panasonic AC ADAPTOR KX-A11-6.

LOCATION OF CONTROLS

Base Unit
(KX-TCM940H-B)



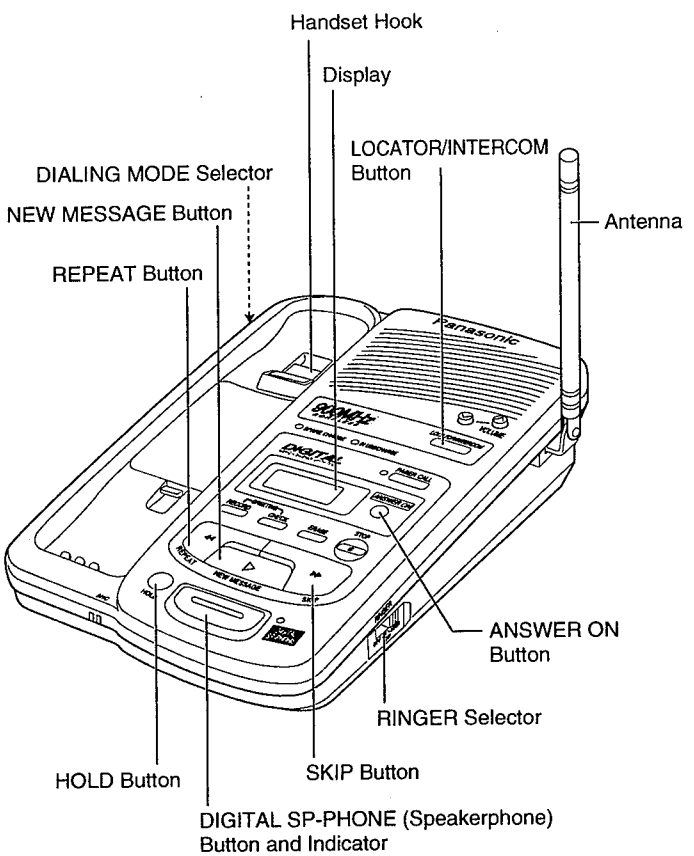


Fig.1

KX-TCM940-B

Portable Handset (KX-TCM940R-B)

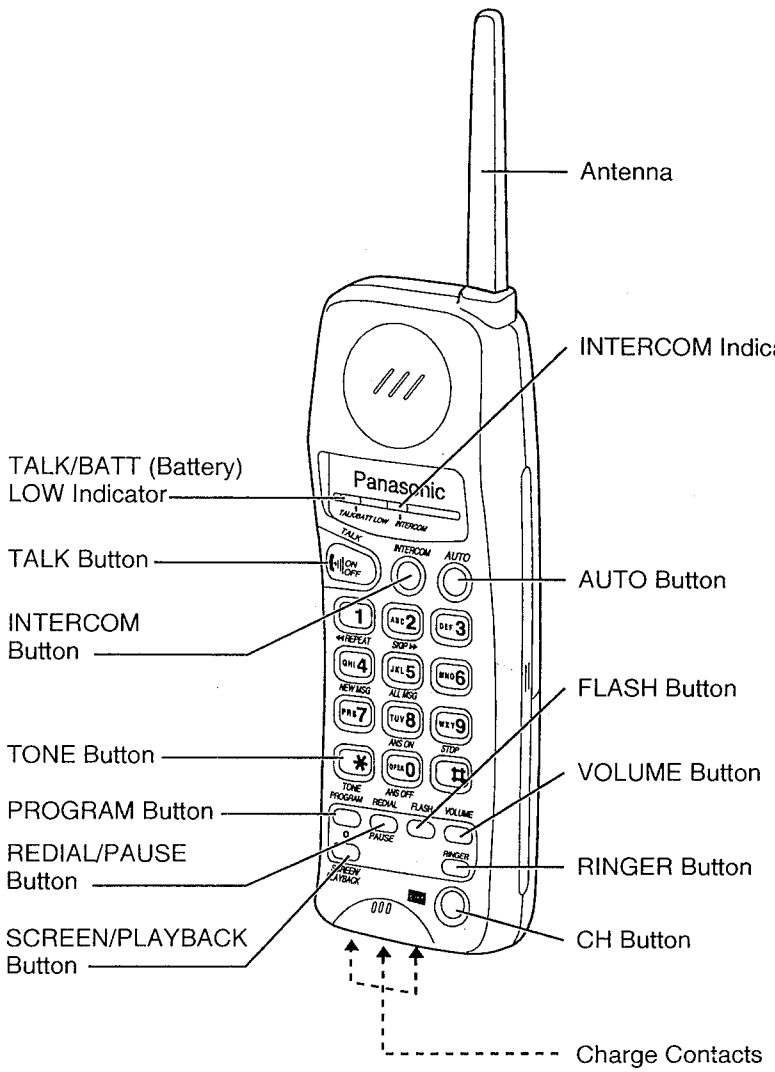
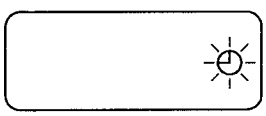
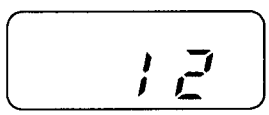


Fig.2

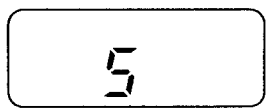
Base unit display



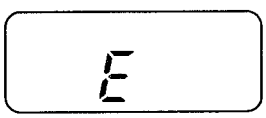
The clock needs adjusting.



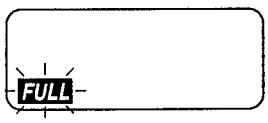
12 messages have been recorded.



The speaker volume level is set to "5". You can select:
- 9 levels (0-8) while using the answering system.
- 8 levels (1-8) while using the speakerphone.

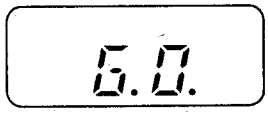


Your greeting message was not recorded correctly. Record it again.



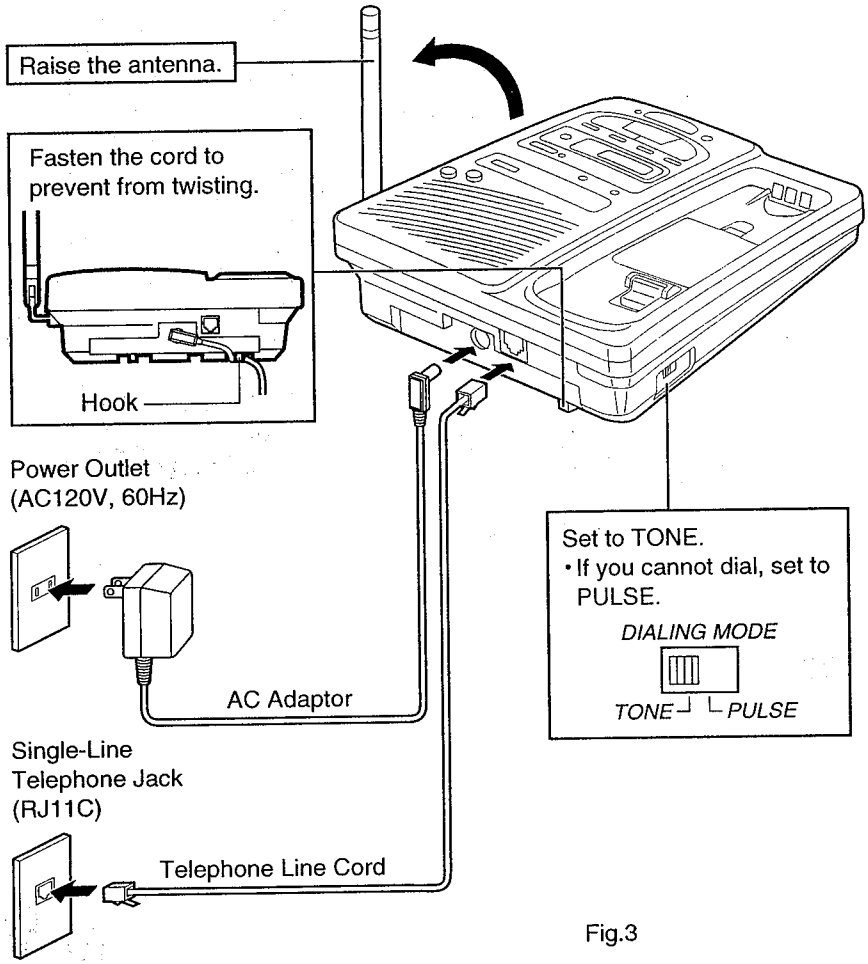
Memory is full. Erase some or all of the messages.

The unit is in programming mode.



The recording time is set to "greetong only".

CONNECTION TO A TELEPHONE LINE



This connection is for U.S.A. version only.

Refer to the simplified manual (cover) for Canada or other areas.

Fig.3

Notes:
– USE ONLY Panasonic AC ADAPTOR KX-A11-6.
– The AC adaptor must remain connected at all times. (It may feel warm during use. This is normal.)

Adding Another Phone

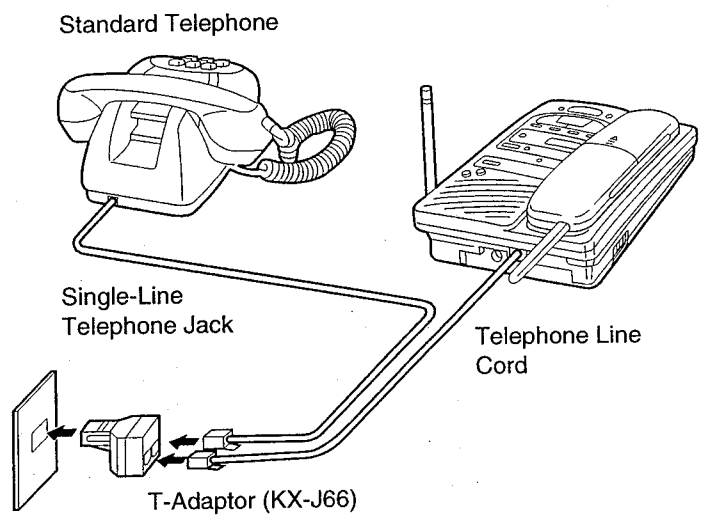


Fig.4

KX-TCM940-B

DISASSEMBLY INSTRUCTIONS

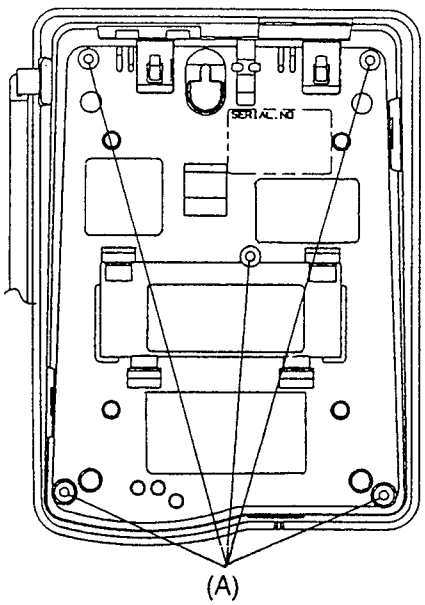


Fig.5

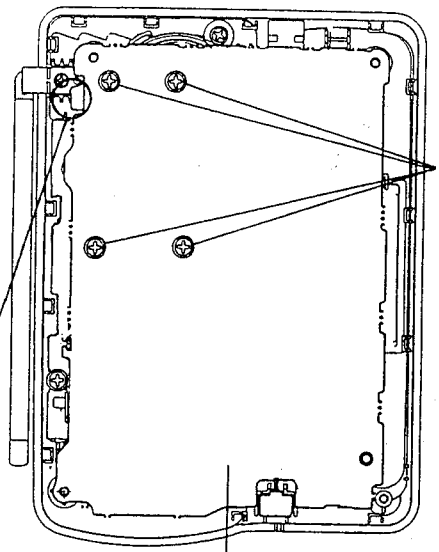


Fig.6

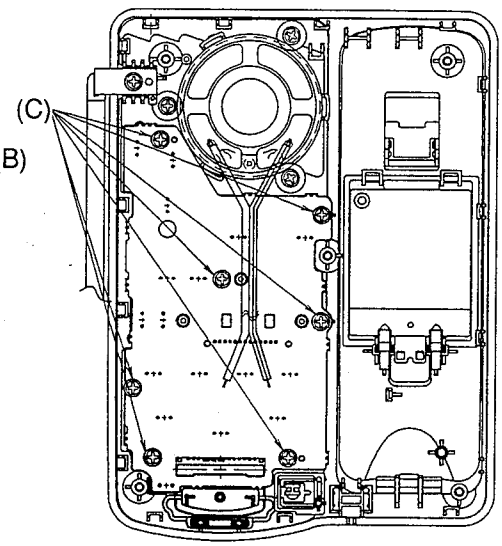
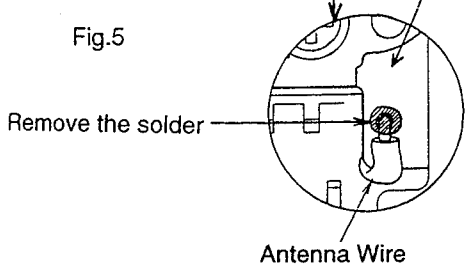


Fig.7



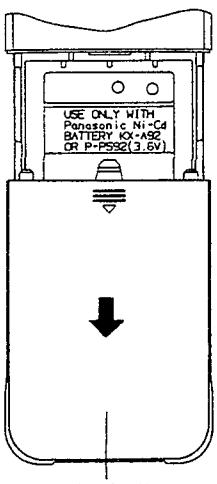


Fig.8

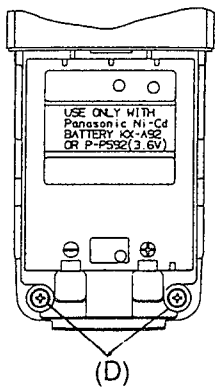


Fig.9

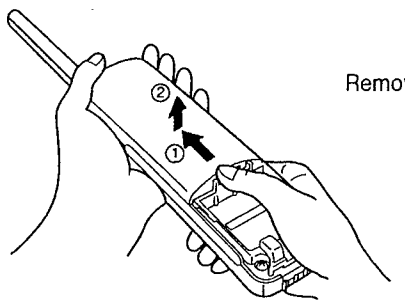


Fig.10

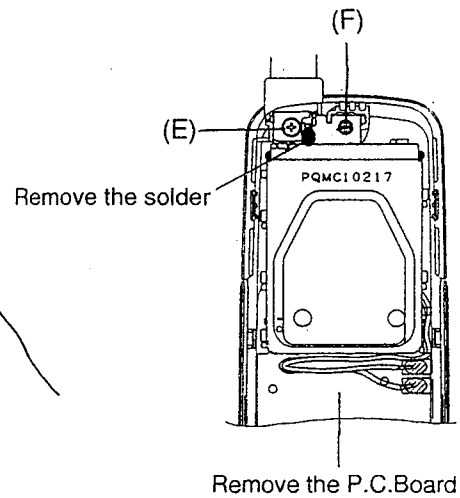


Fig.11

Ref No.	Procedure	Shown in Fig. –	To Remove	Remove
1	1	5	Lower Cabinet	Screws (3×14) ..... (A)×5
2	1, 2	6	Main P.C. Board	Remove the P.C. Board
3	1~3		RF Unit	Screws (7.6×8) ..... (B)×4
4	1~4	7	Operation P.C. Board	Screws (3×10) ..... (C)×7
5	5	8	Battery Cover	Remove the Battery Cover
6	5, 6	9	Rear Cabinet	Screws (2.6×12) ..... (D)×2
7	5~7	11	Antenna	Screw (2.6×12) ..... (E)×1
8	5~8	11	P.C. Board	Screw (2.6×12) ..... (F)×1

Note: When disassembling the cabinet cover of portable handset, press it direction of arrow as shown Fig. 10.

ADJUSTMENT

OBJECTIVE

This procedure will enable the technician to make adjustments to the KX-TCM940-B PORTABLE HANDSET and BASE UNIT.

GENERAL INFORMATION

This procedure has 2 sections. The first section instructs the technician on how to align the PORTABLE HANDSET. We recommend aligning the PORTABLE HANDSET first, since you will need the PORTABLE HANDSET to align the BASE UNIT. The second section aligns the BASE UNIT. You can use either section separately, or together to align the entire cordless phone unit.

At the beginning of each section, you will find a preparation procedure instructing you on how to prepare the unit to the point of placing the unit in TEST mode. Please follow this procedure to insure proper alignment.

Each section's procedure consists of Adjustment Items adjusting one specific variable hardware component.
Each Item lists the equipment needed, how to connect and setup the equipment, how to make the adjustment, and how to verify the adjustment if necessary.

Before the actual procedure, you will find a procedure detailing how to place that part in TEST mode. You will have to perform this procedure before each individual Adjustment Item.

Once aligned, please remove all equipment connections and solder points, and reassemble the unit. As a final check, power up the phone and check for PORTABLE HANDSET linking with the BASE UNIT.

EQUIPMENT

1. Radio Tester : Marconi Model 2295A or later.
2. 4.5 digit Digital Multimeter : B&K Model 2833 or compatible.
3. Oscilloscope, single or dual channel : Panasonic VP-5512P100 or compatible.
4. Telephone Analyzer : B&K Model 1050 or compatible.
5. DC Power Supply, capable of supply 3.9V DC at 100mA NOTE : only needed if Telephone Analyzer does not have DC VOLTS output available.
6. High Frequency Attenuator, 10dB or greater.
7. Corded Telephone.
8. High Frequency Cable : BNC end to open end.
9. Audio Cable : BNC end to alligator clip end.
10. High Frequency Adjustment Tool:
11. Isolation Capacitors, quantity of 2, 10 µF maximum, 50V DC or greater.
12. Soldering Iron, solder, and various tools.

PORTABLE HANDSET PREPARATION

Please perform the following steps to prepare the PORTABLE HANDSET for alignment. Please refer to the PORTABLE HANDSET REFERENCE DRAWING for connection and test point locations.

1. Remove battery cover and battery.
2. Remove both screws at the case bottom.
3. Grabbing hold of the back near the bottom, gently pry off the back of the case.
4. Remove the antenna mounting screw. While heating the antenna solder connection, pull out the antenna.
5. Remove the top P.C.Board mounting screw.
6. Unsolder both speaker connections on P.C.Board.
7. Remove the PORTABLE HANDSET P.C.Board.
8. Remove the keypad membrane.
9. Solder High Frequency Cable open end to ANT and RF GND points.
10. Using the Digital Multimeter, measure DC VOLTS output on the Telephone Analyzer. Adjust the output voltage to 3.9V DC.
11. Solder battery connection wires at the points shown in the PORTABLE HANDSET REFERENCE DRAWING. Solder the positive lead to IC204, towards the bottom of the P.C.Board. Solder the negative lead to the **MIC** minus lead, closest to IC204. **DO NOT APPLY POWER TO THE PORTABLE HANDSET AT THIS TIME!!!!!!**
12. Solder a small, insulated piece of wire to **GND** as well.
13. Solder 1 isolation capacitor's positive lead to **SP+** test point (TP4). When soldering, keep the lead close to the P.C.Board as possible since you will lay the keypad membrane over part of this lead.
14. Solder a small, short, insulated wire to **MIC** test point (TP8).
15. Lay the keypad membrane over the keypad switch contacts.

KX-TCM940-B

SYMPTOM/REMEDY TABLE

If you have one of the listed symptoms, please refer to this table and make the appropriate adjustments.

SYMPTOM	REMEDY
Does not link with BASE UNIT	Check Items (A) and (B). If both items are OK, adjust Items (D) and (E).
Speaker level is unstable	Check Items (A) and (B). If both items are OK, adjust Items (C).
Tx sound is unstable	Check Items (A) and (B). If both items are OK, adjust Items (F).

PORTABLE HANDSET ADJUSTMENT PREPARATION

Please perform the following procedure before starting the Adjustment Procedure. You only have to perform this procedure only once to complete all Items, but you will have to perform this procedure to make an individual Adjustment Item.

1. You will need all equipment listed in the Item's EQUIPMENT section.
2. Setup all equipment as specified in the Item's PROCEDURE section SETUP portion.
3. On the PORTABLE HANDSET under test, press and hold down the 1, 9, and ✳ keys.
4. Apply power to the PORTABLE HANDSET.
5. Release the 3 keys. You should hear the PORTABLE HANDSET beep. If you do not hear a beep, remove the power from the PORTABLE HANDSET and repeat the last 2 steps.
6. Press the **INTERCOM** key, then press the **TALK** key. PORTABLE HANDSET should now be in TEST MODE (CH 1 TALK). The IN USE/BATT LOW LED should be on. If the PORTABLE HANDSET is not in TEST MODE, remove the power and repeat the last 3 steps.
7. Remove the keypad membrane and lay it aside.

ADJUSTMENT PROCEDURE

ADJUSTMENT ITEM DESCRIPTION	EQUIPMENT	PROCEDURE
(A) Rx VCO Voltage Confirmation only	**Digital Multimeter** SETUP to measure DC Voltage, 20V range	Connect negative lead to RF module metal cover and positive lead to **TP5**. Measure voltage and confirm that this voltage is between 0.8V DC and 1.8V DC. DO NOT PROCEED IF NOT IN RANGE!!
(B) Tx VCO Voltage Confirmation only	**Digital Multimeter** SETUP to measure DC Voltage, 20V range	Connect negative lead to RF module metal cover and positive lead to **TP6**. Measure voltage and confirm that this voltage is between 0.8V DC and 1.8V DC. DO NOT PROCEED IF NOT IN RANGE!!
(C) SP Output	**Marconi** SETUP Put in Receiver Test Mode. RF GEN FREQ 902.1000MHz LEVEL 60dBμV SET MOD FREQ 1.000kHz LEVEL 5.000kHz High Frequency Cable to left RF Connector. Audio Cable positive lead to isolation capacitor, negative lead to **GND**, BNC end to AF INPUT connector.	Adjust **VR202** until **AF VOLTS** equals **-33dBV +/-1dBV** Note This voltage reading is with no speaker or load attached to the PORTABLE HANDSET P.C.Board.

ADJUSTMENT ITEM DESCRIPTION	EQUIPMENT	PROCEDURE
(D) 20dB Electric Detection	**Marconi** SETUP Put in Receiver Test Mode. RF GEN FREQ 902.1000MHz LEVEL 60dBμV SET MOD FREQ 1.000kHz LEVEL 5.000kHz One end of BNC cable to left RF connector, other end to Attenuator Input. Audio Cable positive lead to isolation capacitor, negative lead to **GND**, BNC end to AF INPUT connector. **Oscilloscope** SETUP X1 probe connected to INPUT 1. Probe ground connected to **GND**. TIME/DIV 1ms VOLT/DIV 1V Auto trigger **Attenuator** SETUP High Frequency Cable to Attenuator Output.	On Marconi, press SINAD until the display shows the SINAD value and press **dB**. Then press RF **GEN** and **LEVEL**. Attach the oscilloscope probe to 20dB test point (TP7). Using the **VARIABLE** knob on the Marconi, decrease RF GEN LEVEL until SINAD value is between **7dB** and **9dB**. NOTE: this value will not be stable. Adjust **VR401** until oscilloscope voltage toggles. This is the 20dB SET POINT. NOTE: toggling may not occur at regular intervals. Decrease RF GEN LEVEL until the SINAD value decreases by at least 3dB. Check that oscilloscope voltage is high. Now increase REF GEN LEVEL until SINAD value is at least 3dB above the 20dB SET POINT. Check that oscilloscope voltage is low.
(E) MIC Input	**Marconi** SETUP Put in Transmitter Test mode. **AF GEN** **FREQ 1.000KHZ** **LEVEL 23mV** Connect High Frequency Cable to right RF connector. Connect Audio Cable positive lead to **MIC**, negative lead to **GND**, BNC end to AF GEN OUTPUT.	Adjust **VR201** until Marconi **MOD LEVEL** equals **5kHz +/- 0.5kHz**
(F) Standard Frequency	**Marconi** SETUP Put in Transmitter Test mode. **AF GEN** **FREQ 1.000kHz** **LEVEL 21mV** Connect High Frequency Cable to right RF connector. Connect Audio Cable positive lead to **MIC**, negative lead to **GND**, BNC end to AF GEN OUTPUT	Adjust **VC401** until Marconi **TX FREQ** equals **926.100MHz +/-0.0005MHz** Note This Item's setup is exactly the same as Item (E). If you have done Item (E), simply look at TX FREQ and make the adjustment.

Once aligned, please perform the following procedure.

1. Disconnect all equipment and solder connections. Use solder wick to clean up any solder you added.
2. Install the keypad membrane on top of the PORTABLE HANDSET keys.
3. Install the PORTABLE HANDSET P.C.Board.
4. Solder speaker wires back onto the P.C.Board observing correct polarity.
5. If you will align Item (E) RX Input in BASE UNIT, then solder a short wire across the MIC leads. Remember to unsolder this wire after you completed the BASE UNIT alignment.
6. Insert antenna into the case.
7. Install antenna and top P.C.Board mounting screws and solder antenna connection.
8. Install case back and bottom mounting screws.
9. DO NOT INSTALL THE BATTERY AT THIS TIME!!!!!!

PORTABLE HANDSET REFERENCE DRAWING

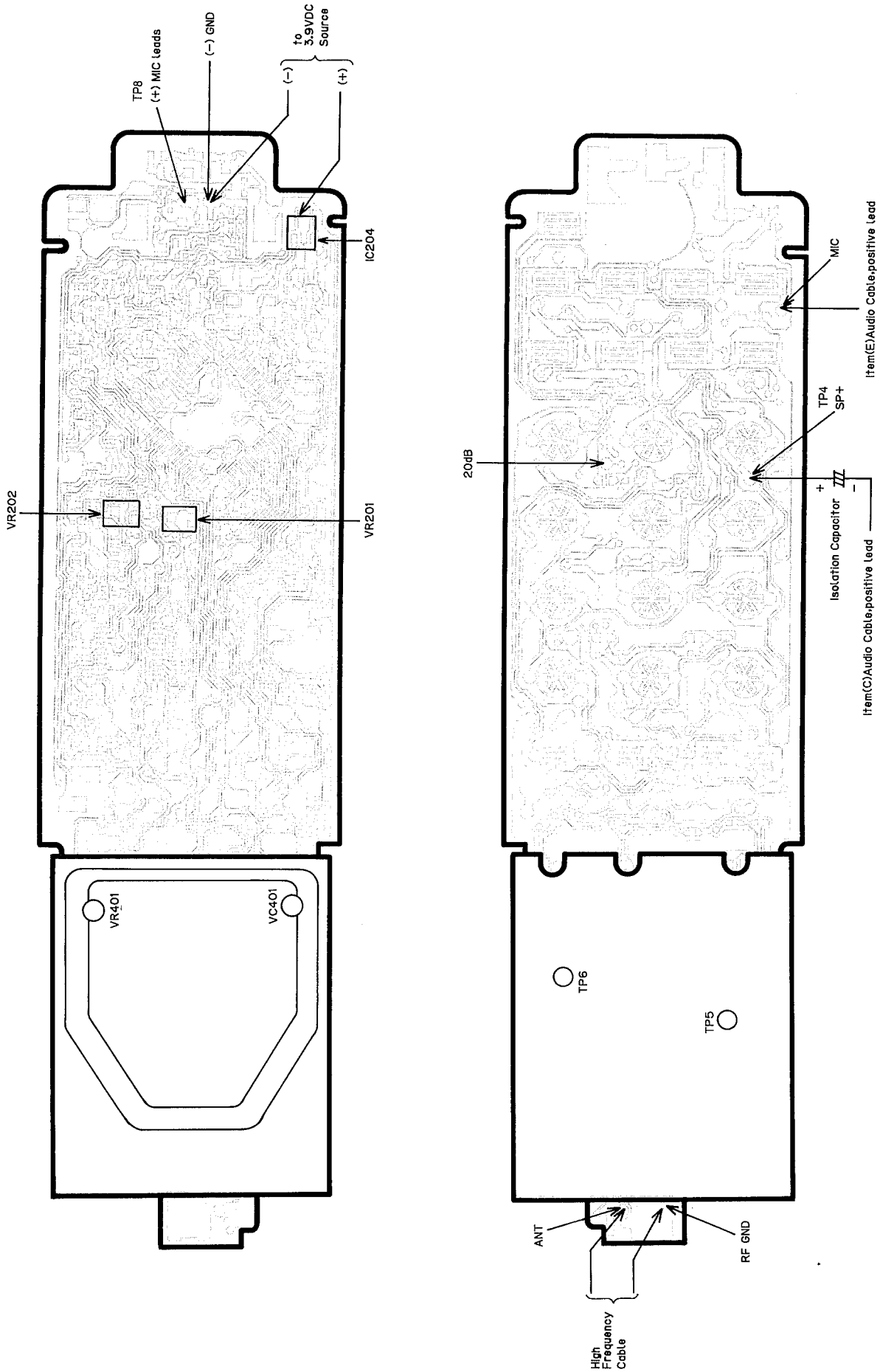


Fig. 11

BASE UNIT PREPARATION

Please prepare the BASE UNIT before performing any adjustment procedures. Refer to the BASE UNIT REFERENCE DRAWING for connection and test point locations.

1. Unscrew all 5 screws from bottom of cabinet. Remove cabinet bottom.
2. Unsolder antenna wire at RF module.
3. Solder a short piece of wire from **TP[CDL-TEST] to TP[COM]**.
4. Solder a short, insulated wire to **GND** as shown on the BASE UNIT REFERENCE DRAWING.
5. Solder one isolation capacitor's positive lead to the main P.C.Board **TIP** point and the other isolation capacitor's positive lead to the main P.C.Board **RING** point.
6. Connect the Audio Cable, positive lead to the **TIP** isolation capacitor's free lead, the negative lead to the **RING** isolation capacitor's free lead. Do not connect the BNC end of the cable.
7. Connect the Telephone Analyzer **PHONE TEST JACK #1** to the BASE UNIT P.C.Board phone jack.
8. Connect the corded telephone to the Telephone Analyzer **PHONE TEST JACK #2**.
9. Remove main P.C.Board from cabinet top and place beside cabinet.
10. Solder High Frequency Cable open end to ANT and RF GND as specified in BASE UNIT REFERENCE DRAWING.

SYMPTOM/REMEDY TABLE

If you have one of the listed symptoms, please refer to this table and make the appropriate adjustments.

SYMPTOM	REMEDY
Does not link with PORTABLE HANDSET	Check Items (A) and (B). If both are OK, adjust Items (E) and (F).
Transmission sound to PORTABLE HANDSET receiver is unstable	Check Items (A) and (B). If both are OK, adjust Items (C) and (D).

BASE UNIT ADJUSTMENT PREPARATION

Please perform the following steps to prepare the BASE UNIT for the Adjustment procedure.

1. Connect P.C.Board to all equipment as specified in **PROCEDURE** section, **SETUP** portion.
2. Connect AC Adaptor to AC Jack of BASE UNIT main P.C.Board.
3. Press **LOCATOR/INTERCOM** button twice. BASE UNIT P.C.Board should be in TEST MODE (CH1 TALK). If unit is not in TEST MODE, remove power from P.C.Board and repeat last step.

ADJUSTMENT ITEM DESCRIPTION	EQUIPMENT	PROCEDURE
(A) Rx VCO Voltage Confirmation only	**Digital Multimeter** SETUP to measure DC Voltage, 20V range.	Connect negative lead to RF module metal cover and positive lead to **TP5**. Measure voltage and confirm that this voltage is between 0.8V DC and 1.8V DC. DO NOT CONTINUE IF VOLTAGE IS OUT OF RANGE!!!
(B) Tx VCO Voltage Confirmation only	**Digital Multimeter** SETUP to measure DC Voltage, 20V range.	Connect negative lead to RF module metal cover and positive lead to **TP6**. Measure voltage and confirm that this voltage is between 0.8V DC and 1.8V DC. DO NOT CONTINUE IF VOLTAGE IS OUT OF RANGE!!!
(C) Standard Frequency	**Marconi** SETUP Place in Transmitter Test mode. **AF GEN** **FREQ 1.000kHz** **LEVEL 40mV** High Frequency Cable to right RF connector. **Telephone Analyzer** **Corded Phone** Take phone off hook	Adjust **VC301** until Marconi **TX FREQ** equals **902.100MHz +/-0.0005MHz** Note This item's setup is exactly the same as Item (E). If you have done Item (E), simply look at TX FREQ on the Marconi and make the adjustment.

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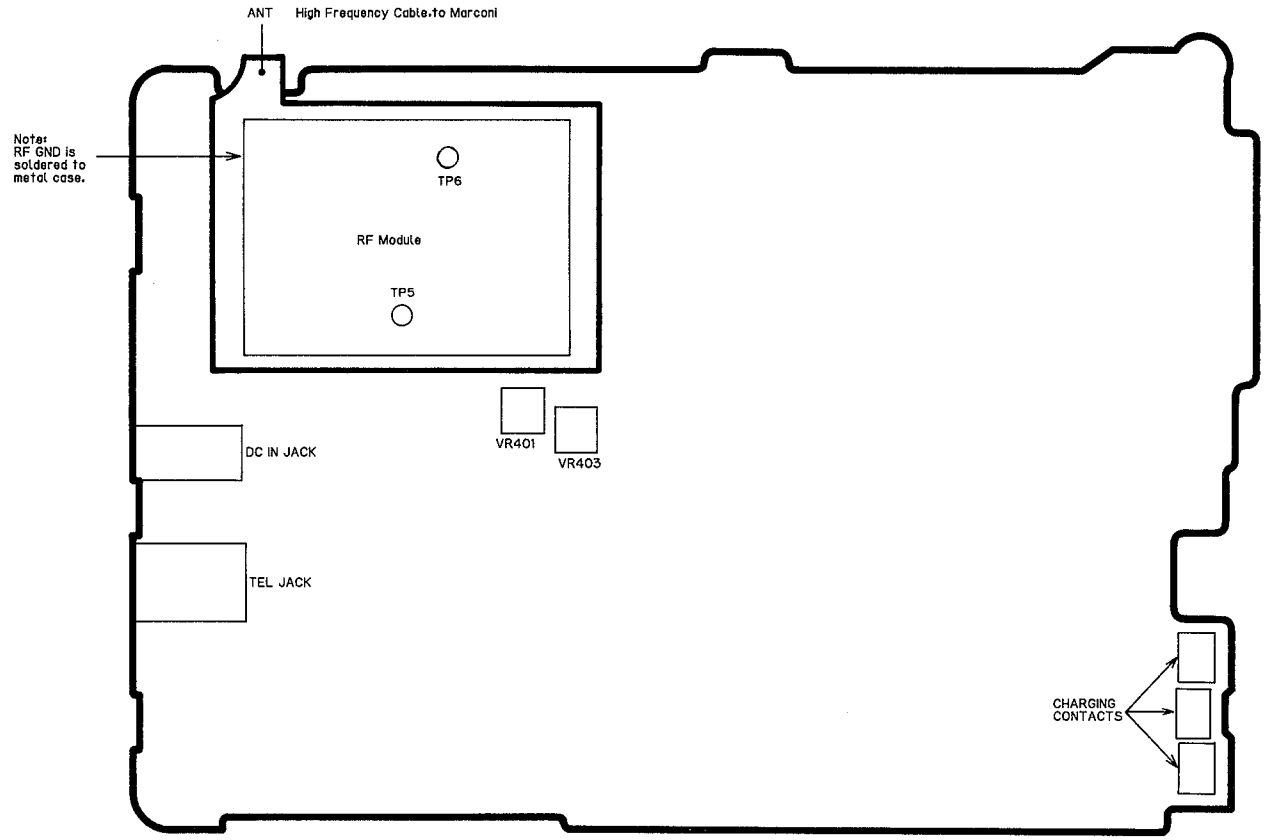
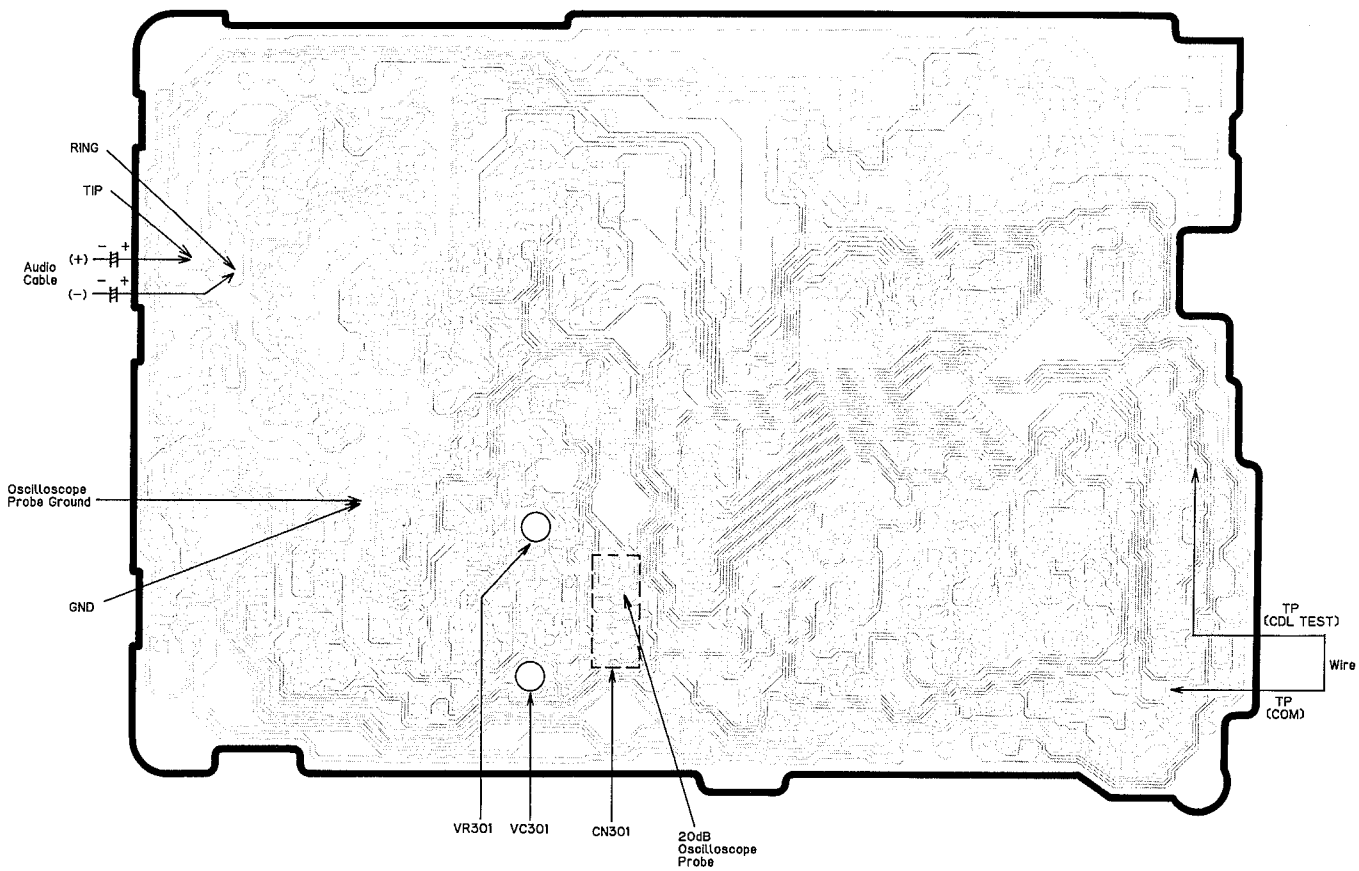
ADJUSTMENT ITEM DESCRIPTION	EQUIPMENT	PROCEDURE
(D) TX Output	**Marconi** SETUP Put in Receiver Test Mode. RF GEN FREQ 926.1000MHz LEVEL 60dBμV SET MOD FREQ 1.000kHz LEVEL 5.000kHz High Frequency Cable to left RF connector. Audio Cable positive lead to **TIP** isolation capacitor, negative lead to **RING** isolation capacitor, BNC end to AF INPUT connector. **Telephone Analyzer** **Corded Telephone** Take phone off hook	Adjust **VR401** until **AF VOLTS** equals **-16.7dBV +/-1dBV** Notes You do not need to take the corded phone off hook, but you will hear the 1kHz tone. This will insure that your setup is probably working.
(E) RX Input	**Marconi** SETUP Place in Transmitter Test mode. **AF GEN** **FREQ 1.000kHz** **LEVEL 40mV** High Frequency Cable to right RF connector. **Telephone Analyzer** **Corded Phone** Take phone off hook **KX-TCM940-B Portable Handset** Placed in TEST mode by inserting battery while pressing 1, 9, and ✳ keys	Adjust **VR403** until **MOD LEVEL** equals **6.5kHz +/-0.5kHz** Notes You need to place the PORTABLE HANDSET in TEST mode to drown spurious RF signals being picked up at the BASE UNIT. By shorting the MIC leads insures that you are sending an unmodulated RF signal. You need the corded phone off hook to keep the telephone analyzer from sending a dial tone to the unit under test. The dial tone adds to the MOD LEVEL value greatly.
(F) 20dB Electric Detection	**Marconi** SETUP Put in Receiver Test Mode. RF GEN FREQ 926.1000MHz LEVEL 60dBμV SET MOD FREQ 1.000kHz LEVEL 5.000kHz One end of BNC cable to left RF connector, other end to Attenuator Input. Audio Cable positive lead to **TIP** isolation capacitor, negative lead to **RING** isolation capacitor, BNC end to AF INPUT connector. **Oscilloscope** SETUP X1 probe connected to INPUT 1. Probe ground connected to **GND**. TIME/DIV 1ms VOLT/DIV 1V Auto trigger **Attenuator** SETUP High Frequency Cable to Attenuator Output **Telephone Analyzer** **Corded Phone** Take off hook	On Marconi, press SINAD until display shows the SINAD vale and press dB. Then press **RF GEN** and **LEVEL**. Connect oscilloscope probe ground to GND. Attach the oscilloscope probe to **20dB** test point (CN301, pin7). Using the Marconi **VARIABLE** knob, decrease RF GEN LEVEL until SINAD value is between **7dB** and **9dB**. This is the 20dB SET POINT. NOTE: this value will not be stable. Adjust **VR301** until oscilloscope voltage toggles. NOTE: toggling may not occur at regular intervals. Decrease RF GEN LEVEL until SINAD value decreases by at least 3dB. Check that oscilloscope voltage is high. Now increase REF GEN LEVEL until SINAD value increases by at least 3dB above 20dB SET POINT. Check that oscilloscope voltage is low.

Once aligned, please reassemble the base unit. Also take off the back of the PORTABLE HANDSET and unsolder the MIC lead short wire if you previously installed it.

BASE UNIT REFERENCE DRAWING





CPU DATA KX-TCM940H-B (Base Unit)

IC201 PQVI4639RA50

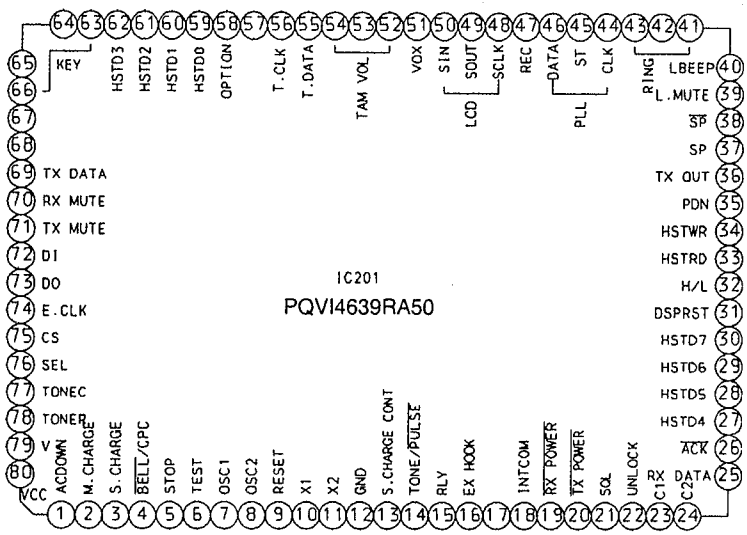


Fig.13

Pin	Description	I/O	High	Low	Pin	Description	I/O	High	Low
1	AC-DOWN	I	AC	Non AC	41	Key TONE/RINGER	O		
2	M. CHARGE	I	Charge		42	RINGER VOL	O	VOL High	VOL Low
3	S. CHARGE	I	Charge		43	RINGER VOL	O	VOL High	VOL Low
4	BELL/CPC	I	CPC	Bell	44	Clock PLL	O	-	-
5	STOP	I	Stop	Active	45	Enable PLL	O	Active	Normal
6	TEST	I	Normal		46	Data PLL	O	-	-
7	OSC1 7.952MHz	I	-	-	47	REC CTL	O	Rec Mode	
8	OSC2 7.952MHz	O	-	-	48	Clock LCD	O	-	-
9	RESET	I	Reset		49	Strobe LCD	O	Data strobe	
10	X1 32.768kHz	I	-	-	50	Data LCD	O	-	-
11	X2 32.768kHz	O	-	-	51	VOX	I	Sound	Non Sound
12	GND		-	-	52	TAM Vol	O		
13	S. CHARGE CONTROL	O	Charge		53	TAM Vol	O		
14	TONE/PULSE	I	Tone	Pulse	54	TAM Vol	O		
15	TR-RLY	O	TR On		55	DATA	O		
16	EX-HOOK	I	Ex-Hook		56	CLOCK	O		
17	CURRENT DET	I			57	Option Strobe	O		
18	INTCOM	O	Intercom	Mute	58	Option Strobe	O		
19	RX POWER	O		On	59	D0/Option Strobe	I/O		
20	TX POWER	O		On	60	D1/Key Strobe	I/O		
21	SQULCH	I			61	D2/Key Strobe	I/O		
22	UNLOCK	I	Unlock		62	D3/Key Strobe	I/O		
23	COMMON 2 for LCD	O			63	Key/Option In	I		Key In
24	COMMON 1 for LCD	O			64	Key/Option In	I		Key In
25	RX-DATA	I			65	Key/Option In	I		Key In
26	DSP ACK	I		ACK	66	Key/Option In	I		Key In
27	D4	I/O			67	TX DATA	O		
28	D5	I/O			68	TX DATA	O		
29	D6	I/O			69	TX DATA	O		
30	D7	I/O			70	RX MUTE	O	Mute	
31	DSP RESET	O	Reset		71	TX MUTE	O	Mute	
32	HST WR	O		Write	72	DI(CPU→IC) EEPROM	O		
33	HST RD	O		Read	73	DO(IC→CPU) EEPROM	I		
34	HI/LOW	O	High	Low	74	CLK EEPROM	O		
35	PDN	O	PWR On	PWR Down	75	CS EEPROM	O	Active	Disable
36	LINE MUTE	O	Mute		76	CPU Speed Select	I	Fixed	-
37	SP-PHONE	O		SP-Phone	77	DTMF-C Out	O	-	-
38	MIC-MUTE	O	SP-Phone	Mic-Mute	78	DTMF-R Out	O	-	-
39	TX-OUT	O	Tx-Out	Mute	79	Vcc	I	-	-
40	TX/LINE Beep	O			80	VTref	I	Fixed	-

CPU DATA KX-TCM940R-B (Portable Unit)

IC201 MN151233KZAC

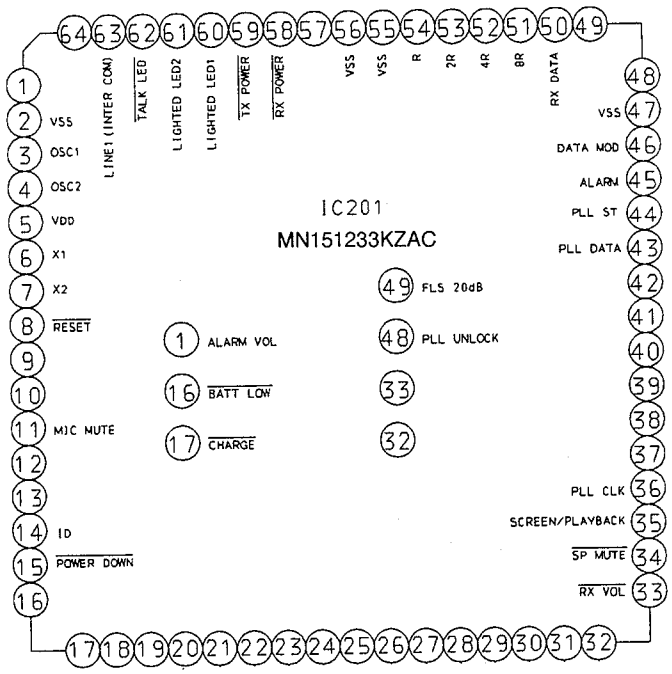
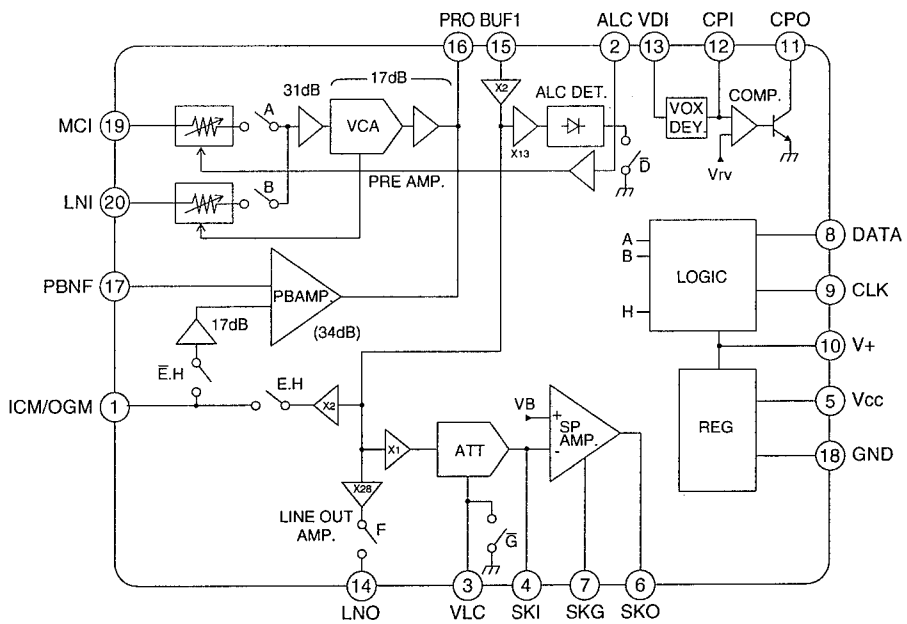


Fig.14

Pin	Description	I/O	High	Low	High-Z	Pin	Description	I/O	High	Low	High-Z
1	ALARM VOL.	O	-	HIGH	LOW	33	RECEPTION VOL.	O	NORMAL	HIGH	-
2	VSS					34	SP-MUTE	O		MUTE	-
3	OSC 1					35	SCREEN LED	O	ON		-
4	OSC 2					36	PLL-CLOCK	O			
5	VDD					37	Not Used				
6	XI					38	Not Used				
7	XO					39	Not Used				
8	RESET	I		(RESET)		40	Not Used				
9	Not Used					41	SIRQ	I			-
10	Not Used					42	IRQ	I			-
11	MIC MUTE	O	MUTE		-	43	PLL DATA	O			-
12	Not Used					44	PLL ST	O		ON	-
13	Not Used					45	ALARM	O			-
14	ID (CTL)	I			-	46	Not Used				
15	POWER DOWN	I		DOWN	-	47		I			-
16	BATT. LOW	I		LOW	-	48	PLL-UNLOCK	I	UNLOCK		-
17	CHARGE	I		CHARGE	-	49	FLS (20)	I		ENABLE	-
18	Not Used					50	RX DATA	I			-
19	Not Used					51	(TX DATA 4)	O			-
20	Not Used					52	(TX DATA 3)	O			-
21	STROBE 8 (OPTION)	O	-			53	TX DATA 2	O			-
22	STROBE 7 (OPTION)	O	-			54	TX DATA 1	O			-
23	STROBE 6 (KEY)	O	-			55		I			-
24	STROBE 5 (KEY)	O	-			56		I			-
25	STROBE 4 (KEY)	O	-			57	Not Used				
26	STROBE 3 (KEY)	O	-			58	RX POWER	O	-	ON	
27	STROBE 2 (KEY)	O	-			59	TX POWER	O	-	ON	
28	STROBE 1 (KEY)	O	-			60	LIGHTED LED 1	O	-	ON	
29	KEY (OPTION) INPUT	I		IN	-	61	LIGHTED LED 2	O	-	ON	
30	KEY (OPTION) INPUT	I		IN	-	62	TALK LED	O	-	ON	
31	KEY (OPTION) INPUT	I		IN	-	63	(INTCOM) LED	O	-	ON	
32	KEY (OPTION) INPUT	I		IN	-	64		O	-		○

KX-TCM940-B

EXPLANATION OF IC TERMINALS (KX-TCM940H-B)



IC101: PQVISC111815

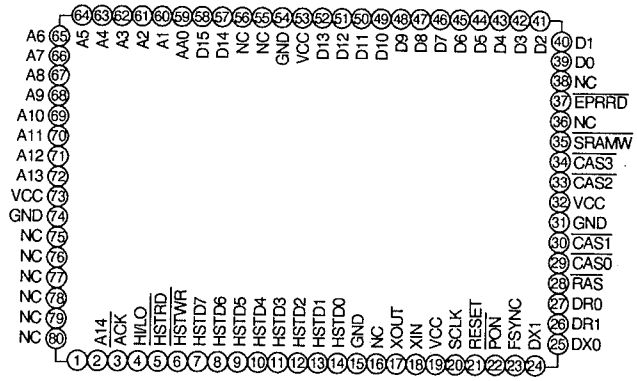
Fig. 15

- **Pin Description**

Pin No.	Name	Description
1	ICM/OGM	I/O for ICM head. I/O impedance is approximately 20 kohm that keeps high impedance sufficient for head load.
2	ALC	For connection to CR for ALC detection smoothing. The time constant of the CR decides the recovery time. The attack time depends on the values of C and internal resistance (approx. 8.5 kohm).
3	VLC	Volume control input. The speaker output controlled by changing the volume resistance between this pin and GND.
4	SKI	Reverse input of the speaker amplifier. The gain and frequency characteristics are set by external CR. Non-reverse input is biased by internal power source (approx. 1/2 Vcc).
5	Vcc	Power source of IC except LOGIC part.
6	SKO	Output of speaker amplifier. Sets frequency characteristics by connecting to Pin 4 in parallel. Speaker's impedance is normally 30 ohms.
7	SKG	GND speaker amplifier output part.
8	DATA	Input of control data for mute mode. For serial synchronous input with clock signal.
9	CLK	Clock input for data input sychronization. Controls shift register by data bit at fall, and latches by reading data at rise.
10	V+	5.4 V stable output to supply bias with microphone.
11	CPO	output of comparator. Connected to open-collector of NPN transistor.
12	CPI	Input of VOX detector comparator. Compares internal reference voltage with gained voltage, and has a bit hysteresis characteristics.
13	VDI	Input of VOX detector.
14	LNO	Output of buffer amplifier for line output. Current amplifier.

Pin No.	Name	Description
15	BUFI	Inputs of Recording amplifier, line output amplifier, speaker amplifier, and ALC detector. These are input after voltage/radio conversion by CR between this pin and pin 16.
16	PRO	Output of MIC/LINE amplifier and playback amplifier.
17	PBNF	Reverse input of playback amplifier for controlling frequency characteristics. The CR network between this pin and Pins 16 and 18 set frequency and gain.
18	GND	GND for all ICs except speaker amplifier.
19	MCI	Input of microphone amplifier. The input resistance is normally 33 kohms.
20	LNI	Input of line amplifier. The same configuration as MCI.

KX-TCM940-B



IC701: PQVID6471A

Fig. 16

- **Pin Description**

Pin No.	Name	Description
14	HSTDB0 (LSB)	HOST data bus. The HOST writes commands and reads status to/from the D6455A via this bus. The HI/$\overline{LO}$ pin selects between the low byte and the high byte of the command/status. This bus is used for input when $\overline{HSTWR}$ is low, and for output when $\overline{HSTRD}$ is low. It has high impedance when $\overline{HSTWR}$ and $\overline{HSTRD}$ are high or $\overline{RESET}$ is high.
8~13	HSTDB1~6	
7	HSTDB7(MSB)	
4	HI/$\overline{LO}$	High/Low byte select. When this signal is low, the HOST can read/write the low byte of the status/command. When high, the byte is selected.
5	$\overline{HSTRD}$	HOST read. When low, the HOST reads the low/high byte of the status word.
6	$\overline{HSTWR}$	HOST write.
3	$\overline{ACK}$	HOST acknowledge. It goes high when the HOST reads the high byte of the status word.
20	SCLK	External memory address bus.
36	$\overline{FLWR}$	Flash Write Enable.
37	$\overline{FLRD}$	Flash Read Enable.
39	D0	External memory data bus.
40~46	D1~D7	
58	MDB15(MSB)	
75	$\overline{CS0}$	Chip Enable for samsung flash.
77	$\overline{CS}$	Chip Select.
78	ALE	Address Latch Enable for samsung flash.
79	CLE	Command Latch Enable for samsung flash.
27	DR0	Serial input for CODEC0 PCM data.
25	DX0	Serial output for CODEC0 PCM data.
26	DR1	Serial input for CODEC1 PCM data.
24	DX1	Serial output for CODEC1 PCM data.
20	SCLK	Clock output to CODECs.
18	XIN	Crystal input pin for internal oscillator. The frequency is 36.864MHz.
17	XOUT	Crystal output pin for internal oscillator.
15,31,54,74	GND	Ground Pin
19,32,73,53	Vcc	+5V battery backed-up power supply input. This power source should be connected to the ARAM.
22	$\overline{PDN}$	Vcc power fail sensor input. When a low level is detected on this pin, D6455A enters power-down mode.

IC702: PQVIKM29N4TC

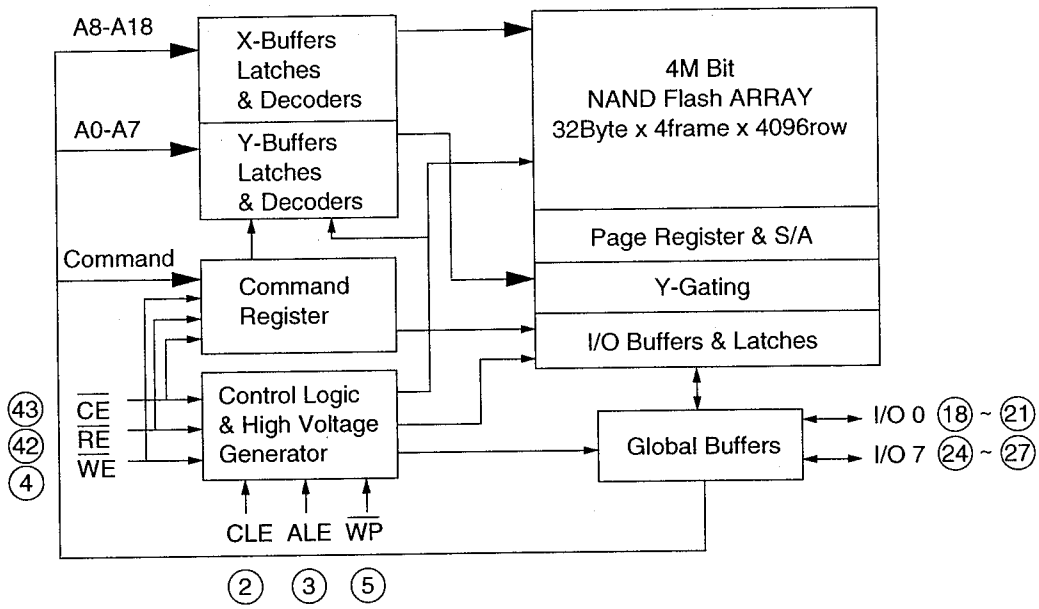


Fig. 17

- **Pin Description**

Pin No.	Name	Description
2	CLE	The CLE input controls the path activation for commands sent to the command register. When active high, commands are latched into the command register through the I/O ports on the rising edge of the WE signal.
3	ALE	The ALE input controls the path activation for address and input data to the internal address/data registers. Addresses are latched on the rising edge of WE with ALE high, and input data is latched when ALE is low.
4	$\overline{WE}$	The WE input controls writes to the I/O port Commands, address and data are latched on the rising edge of the WE pulse.
5	$\overline{WP}$	The WP pin provides inadvertent write/erase protection during power transitions. The internal high voltage generator is reset when the WP pin is active low.
18~21 24~27	I/O 0~I/O 7	The I/O pins are used to input command, address and data, and to outputs data during read operations. The I/O pins float to high-z when the chip is deselected or the outputs are disabled.
41	R/$\overline{B}$	The R/B output indicates the status of the device operation. When low, it indicates that a program, erase or frame access in read operation is in process and return to high state upon completion. It is an open drain output and does not float to high-z condition when the chip is deselected or outputs are disabled.
42	$\overline{RE}$	The RE input is the sequential data-out control, and when active drives the data onto the I/O bus. Data is valid REA after the falling edge of RE which also increments the internal column address counter by one.
43	$\overline{CE}$	The CE input is the device selection control. When CE goes high during a read operation the device is returned to standby mode. However, when the device is in the busy state during program or erase, CE high is ignored, and does not return the device to standby mode.

IC703: PQVIMS7533HK

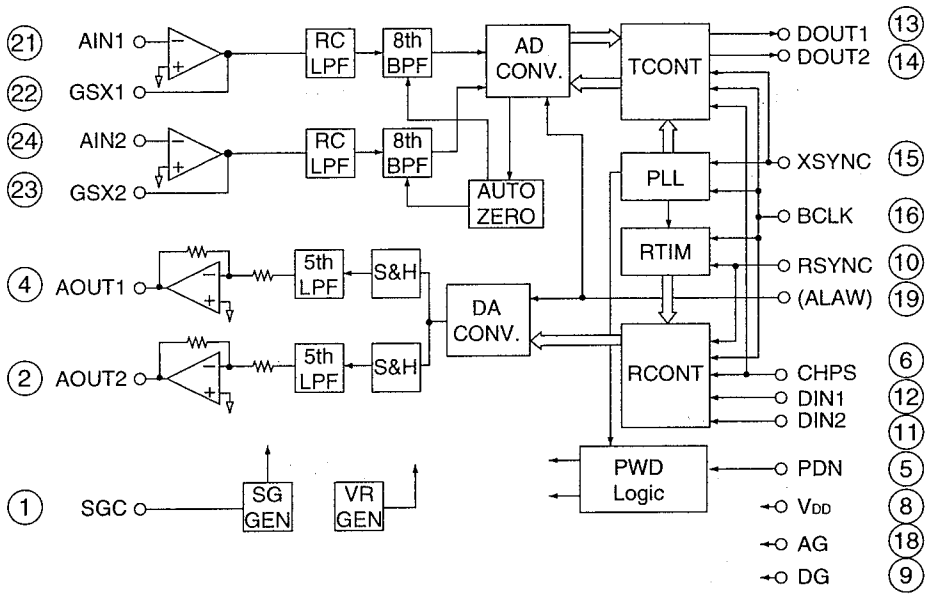


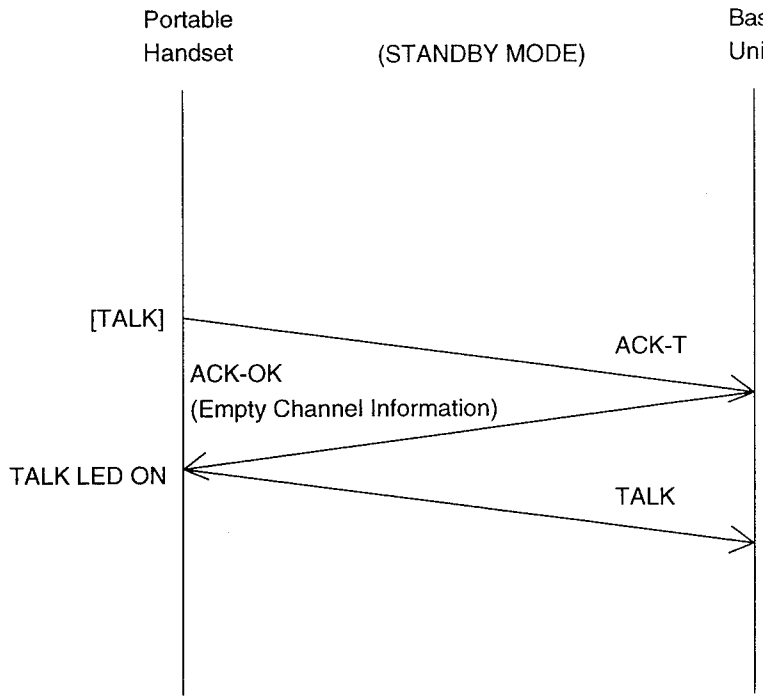
Fig. 18

- **Pin Description**

Pin No.	Name	Description
1	SGC	Bypass capacitor pin for signal ground electrical potential circuit.
2, 4	AOUT, AOUT2	RX analog output pin.
5	PDN	Power down control signal input pin.
6	CHPS	Selecting signal input pin for PCM input/output mode.
8	VDD	+5V power supply input pin.
9	DG	Ground pin for Digital signal.
10	PSYNC	RX synchronization signal input pin.
11, 12	DIN1, DIN2	When selecting the parallel mode, PCM signal is inputted.
13, 14	DOUT1, DOUT2	When selecting the parallel mode, PCM signal is outputted.
15	XSYNC	TX synchronization signal input pin.
16	BCLK	Shift lock signal input pin for PCM signal.
18	AG	Ground pin for analog signal.
19	ALAW	Control signal input pin that select the compounder.
21~24	AIN1, AIN2 GSX1, GSX2	TX analog input pin and TX level adjustment pin.

EXPLANATION OF CPU DATA COMMUNICATION

1. Calling



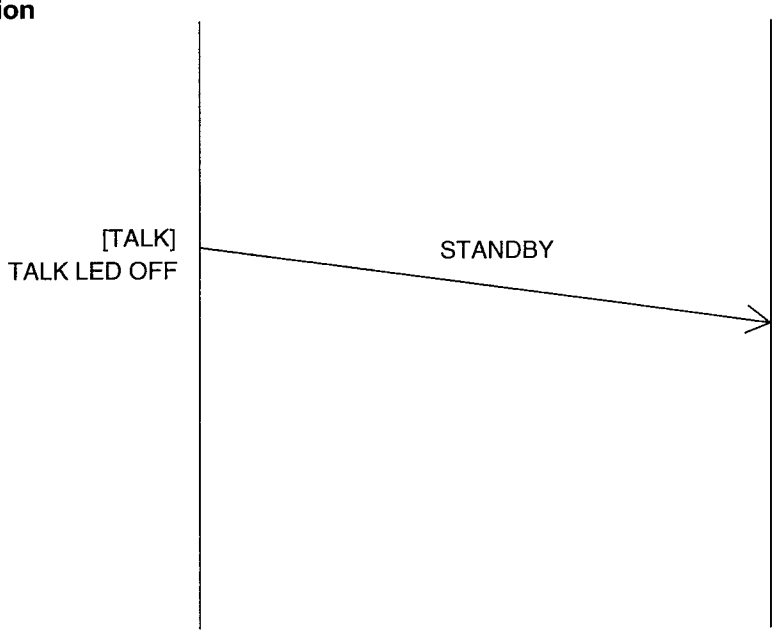
When calling, a communication request DATA (ACK-T) is transmitted from the Portable Handset first, and a permitting data (ACK-OK) is returned from the Base Unit to it, then a communication data (TALK) is transmitted from the Portable Handset.

OFF HOOK
IN USE LED ON

The permitting DATA (ACK-OK) from Base Unit to Portable Handset includes the empty channel information stored in Base Unit. After transmitting the communication DATA (TALK) from Portable Handset to Base Unit, the channel is used.

Fig. 19

2. To terminate Communication



When the TALK button on Portable Handset is pressed during communication, a LINK terminating DATA (STANDBY) is sent to terminate communication.

OFF HOOK
IN USE LED OFF

Fig. 20

3. Ringing

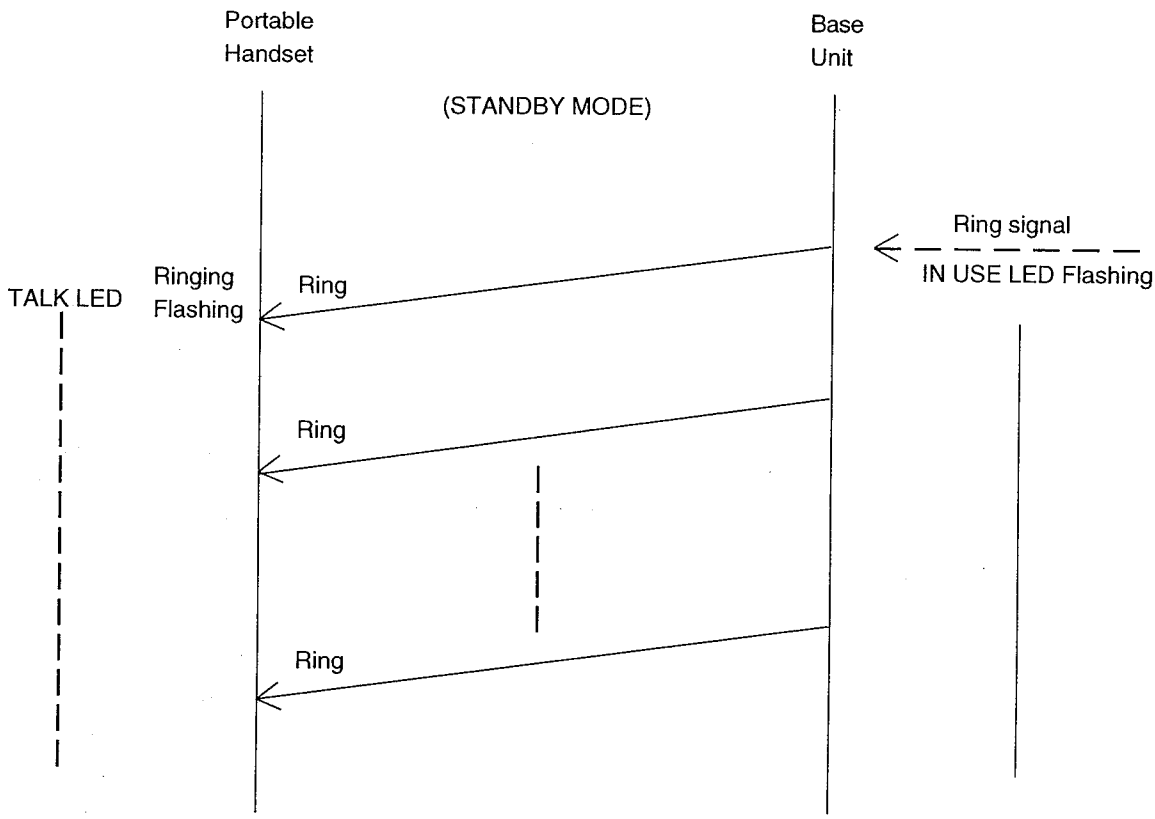


Fig. 21

After detecting the Ring signal from circuit, Base Unit sends a ring signal DATA (Ring), then the Portable Handset starts ringing.

4. Ports for transmitting and receiving of data

Portable Handset :	transmitting ... 54 Pin	receiving ... 50 Pin
Base Unit :	transmitting ... 69 Pin	receiving ... 25 Pin

5. Waveform of DATA used for cordless transmission and reception

The DATA which is transmitted from the Portable Handset to the Base Unit is combination of DATA 0, DATA 1, DATA Delimt, Pre data and End data.

The DATA which is transmitted from the Base Unit to the Portable Handset is combination of DATA 0, DATA 1, DATA Delimt, Pre data and End data.

PORTABLE HANDSET

Transmitting DATA Format

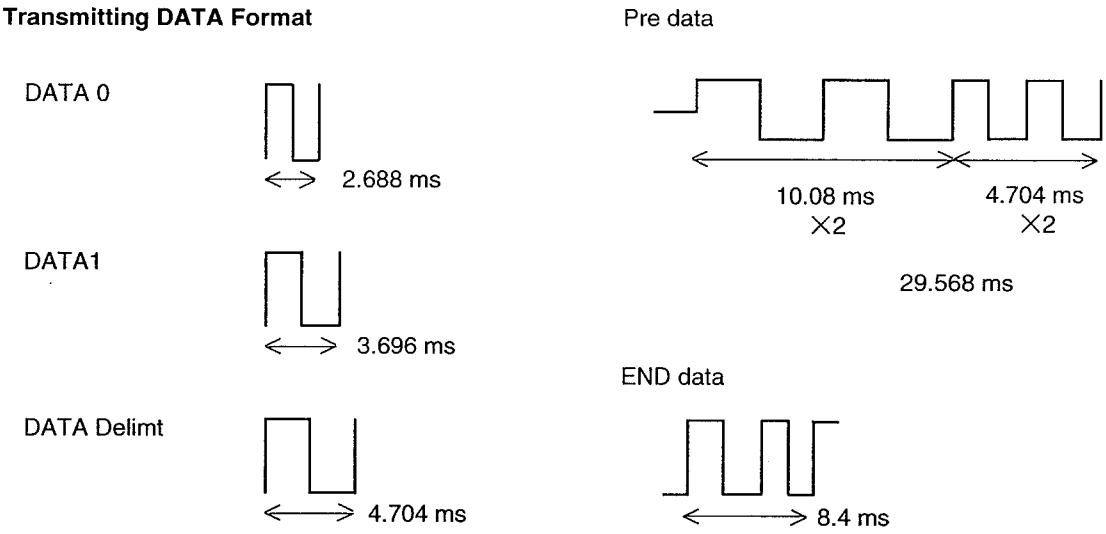


Fig. 22

BASE UNIT

Transmitting DATA Format

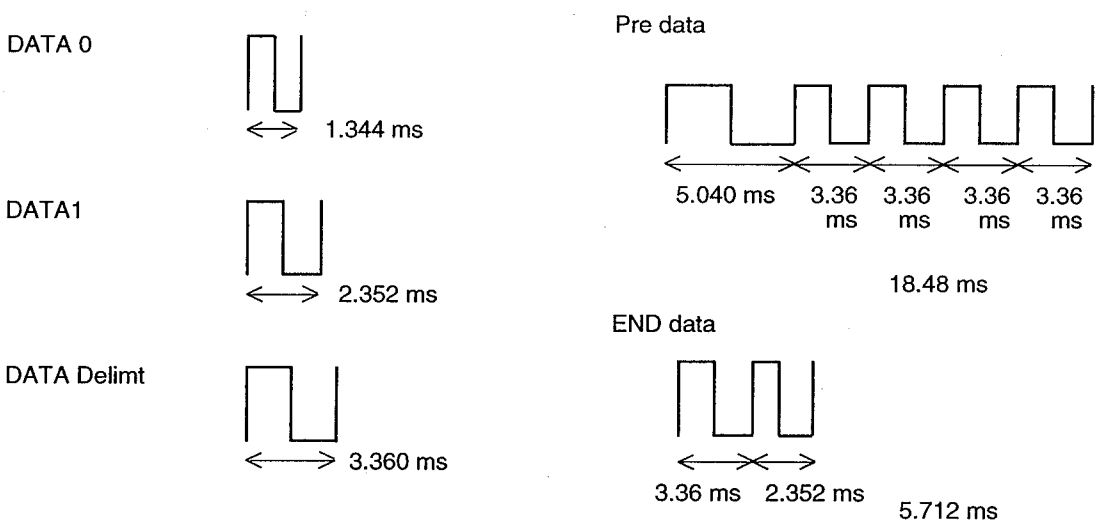


Fig. 23

6. When LINKing

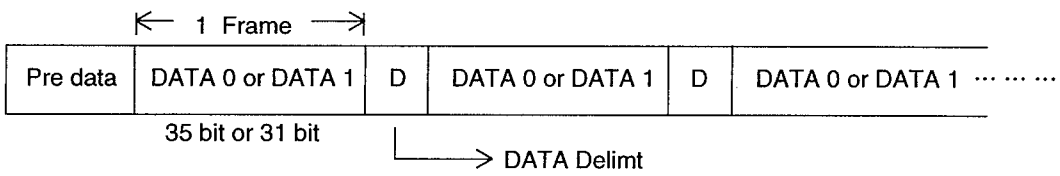


Fig. 24

When LINKing from the Portable Handset (when becoming STBY to TALK), DATA is transmitted in above format. The combined portion of DATA 0 and DATA 1 is transmitted in LINK requesting DATA (35bit) format first. Then, when LINK OK (ACK-OK) DATA (19bit) is returned from the Base Unit, it is sent as LINK from DATA after changing the combination of DATA 0 and DATA 1. And the DATA Delimt is between each Frame as a stop.
The contents of LINK requesting DATA and LINK form DATA are different depending on each operation.

7. Pulse Dial

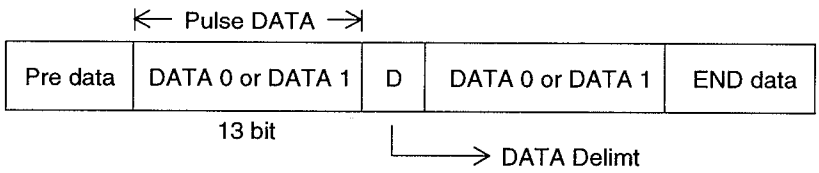


Fig. 25

When executing Pulse Dial,the Pulse Dial DATA is transmitted from the Portable Handset to the Base Unit in above format. The combination of DATA 0 and DATA 1 are changed by each Dial No. And the DATA Delimt is between each Frame as a stop. The number of Frame is 2.

8. Tone Dial

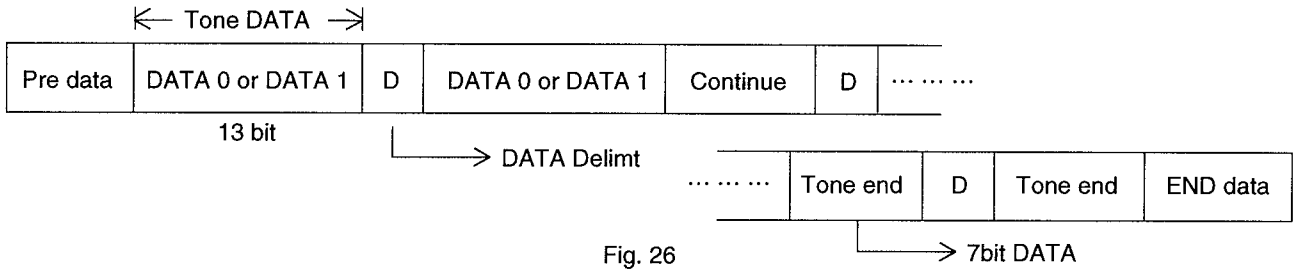


Fig. 26

When executing Tone Dial, Tone Dial DATA is transmitted from the Portable Handset to the Base Unit in above format. The DATA is changed by Dial No. as same as Pulse Dial. When Tone Dialing, DATA (Continue DATA) that the key is pressed continuously is sent to the Base Unit during the key is pressed. When depressing the key, the TONE Dial exterminating DATA (Tone end DATA) is send, and the END data is sent finally.

NOTE

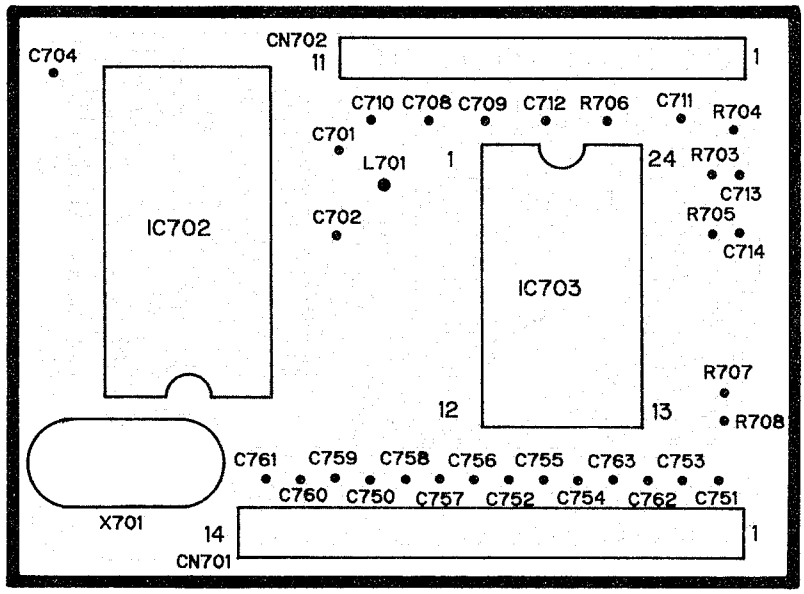
1,000,000 kinds of the security code are available for the model KX-TCM940-B. Each time the portable handset is set on the cradle of the base unit (for charging), the CPU automatically change the security code.

FREQUENCY TABLE (MHz)

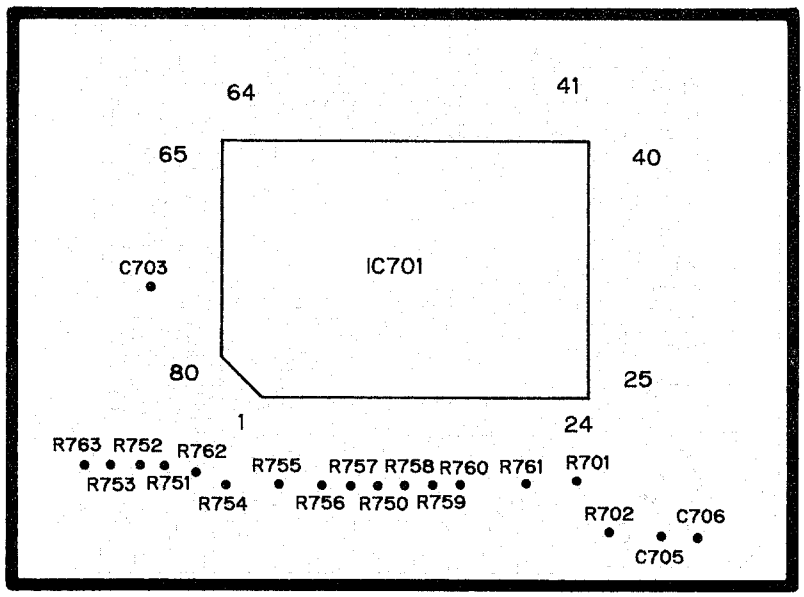
CH	Base Unit TX Portable Handset RX	Base Unit RX Portable Handset TX	CH	Base Unit TX Portable Handset RX	Base Unit RX Portable Handset TX
1	902.100 MHz	926.100 MHz	16	902.850 MHz	926.850 MHz
2	902.150 MHz	926.150 MHz	17	902.900 MHz	926.900 MHz
3	902.200 MHz	926.200 MHz	18	902.950 MHz	926.950 MHz
4	902.250 MHz	926.250 MHz	19	903.000 MHz	927.000 MHz
5	902.300 MHz	926.300 MHz	20	903.050 MHz	927.050 MHz
6	902.350 MHz	926.350 MHz	21	903.100 MHz	927.100 MHz
7	902.400 MHz	926.400 MHz	22	903.150 MHz	927.150 MHz
8	902.450 MHz	926.450 MHz	23	903.200 MHz	927.200 MHz
9	902.500 MHz	926.500 MHz	24	903.250 MHz	927.250 MHz
10	902.550 MHz	926.550 MHz	25	903.300 MHz	927.300 MHz
11	902.600 MHz	926.600 MHz	26	903.350 MHz	927.350 MHz
12	902.650 MHz	926.650 MHz	27	903.400 MHz	927.400 MHz
13	902.700 MHz	926.700 MHz	28	903.450 MHz	927.450 MHz
14	902.750 MHz	926.750 MHz	29	903.500 MHz	927.500 MHz
15	902.800 MHz	926.800 MHz	30	903.550 MHz	927.550 MHz

CIRCUIT BOARD (KX-TCM940H-B) [DSP P.C.BOARD]

(Component View)



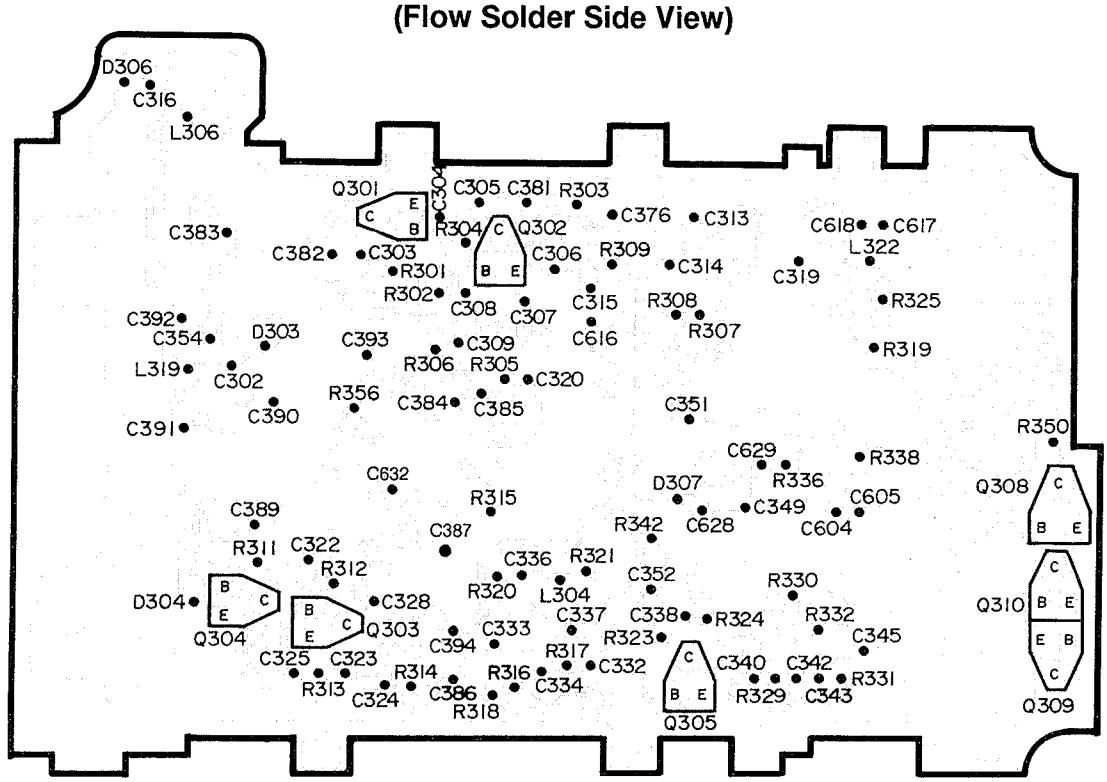
(Flow Solder Side View)



KX-TCM940-B

CIRCUIT BOARD (KX-TCM940H-B) [RF UNIT]

(Flow Solder Side View)



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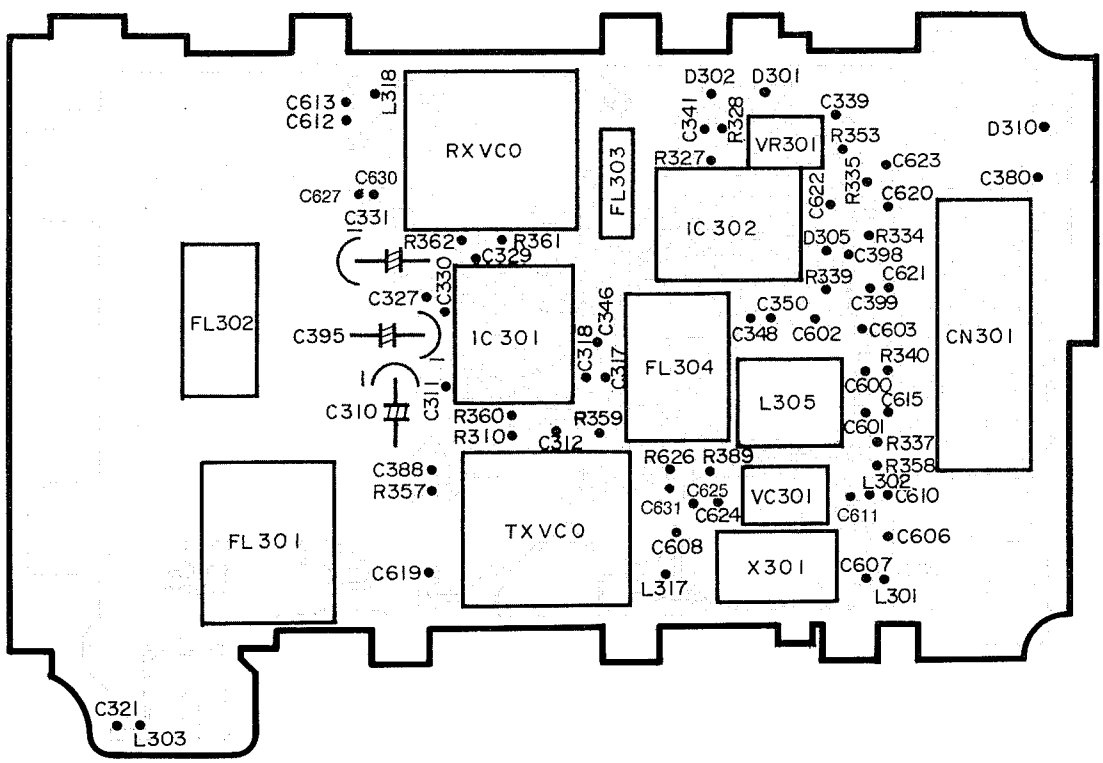
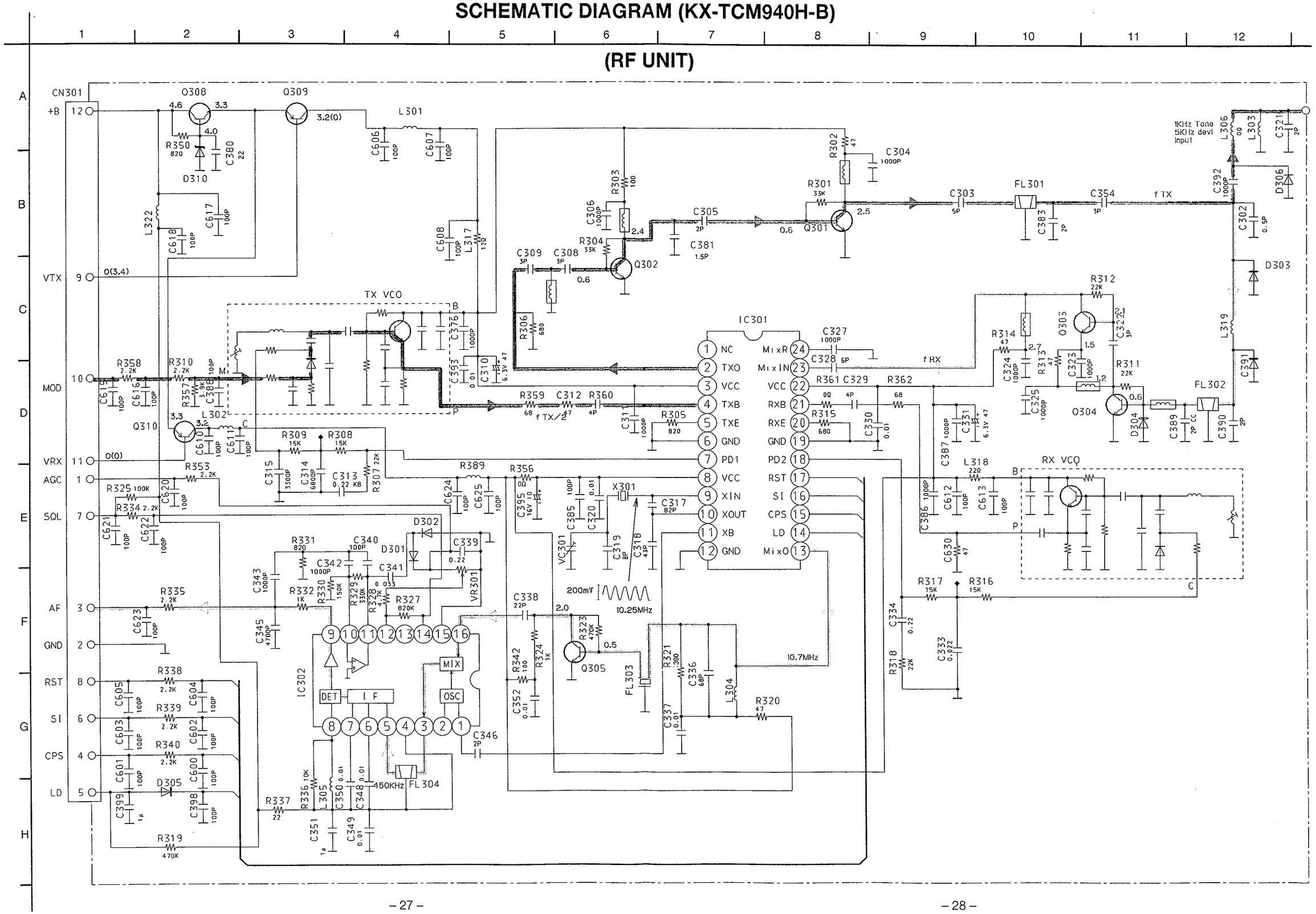


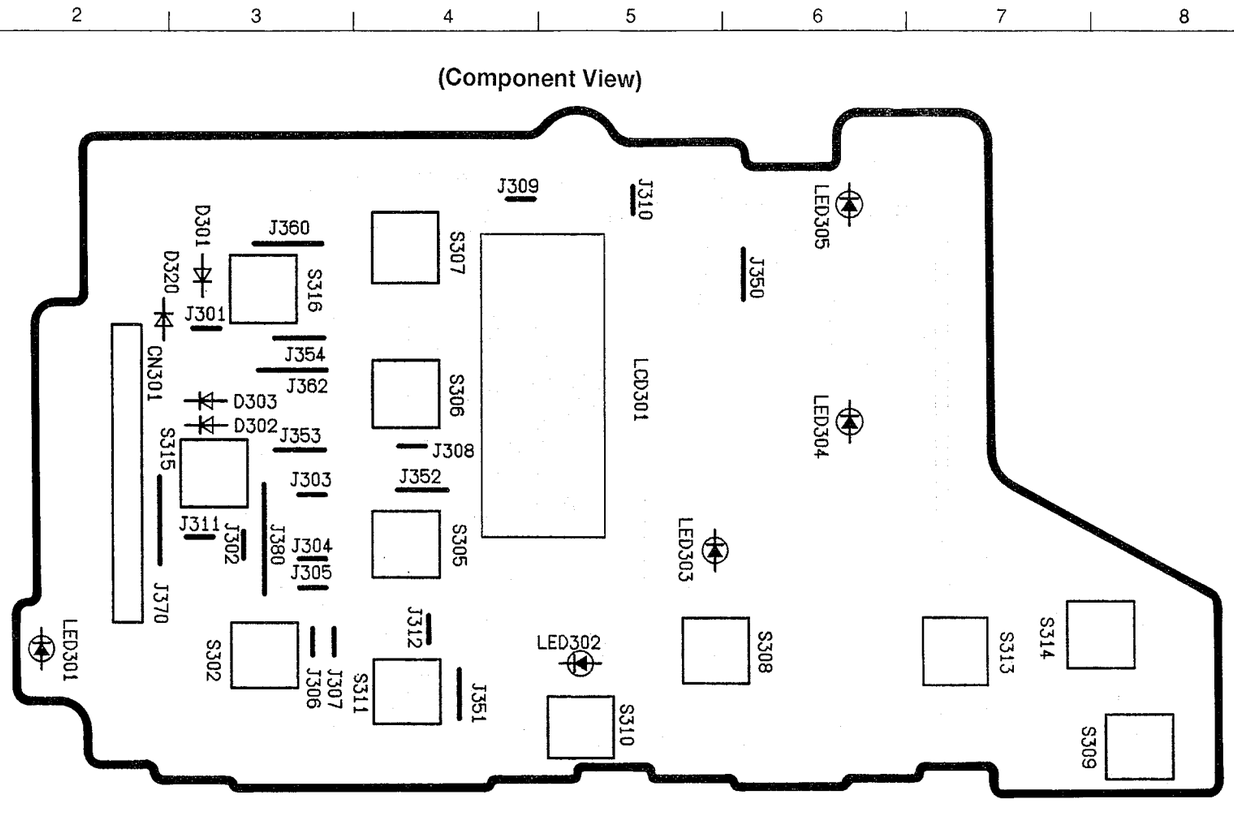
SCHEMATIC DIAGRAM (KX-TCM940H-B)

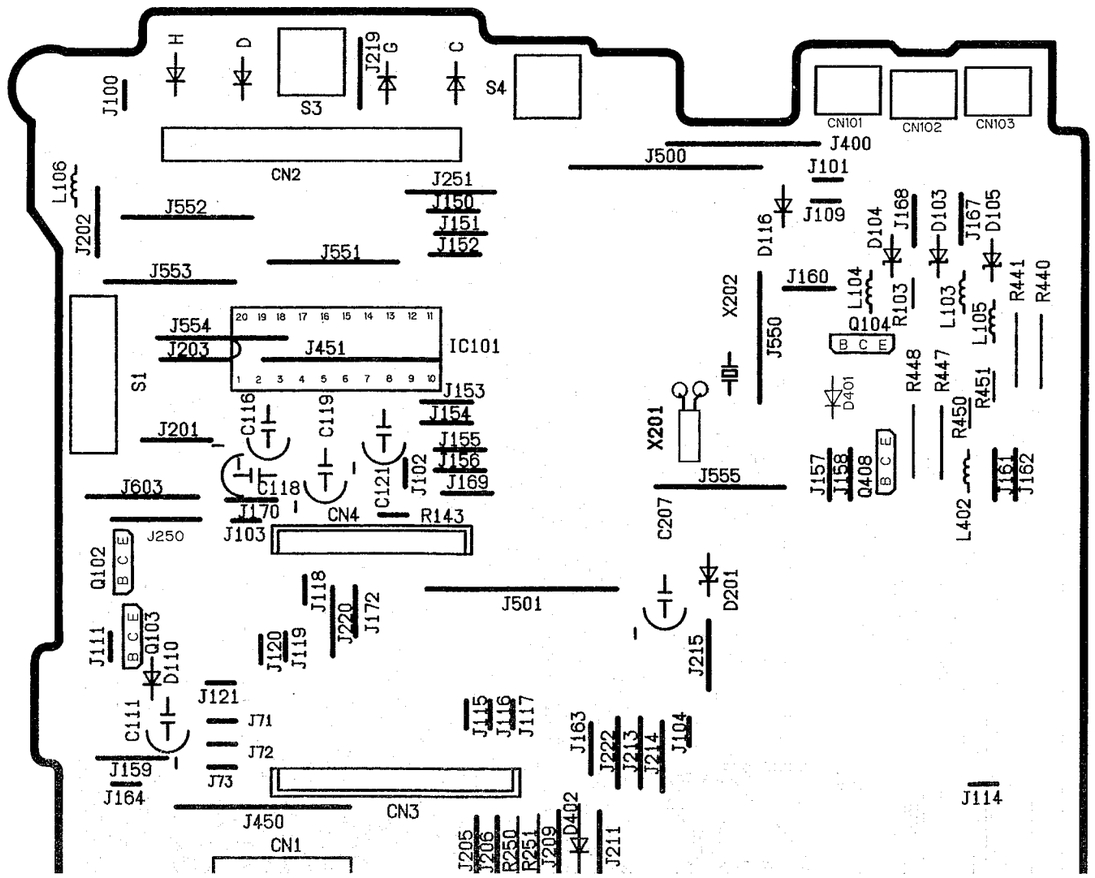
(RF UNIT)

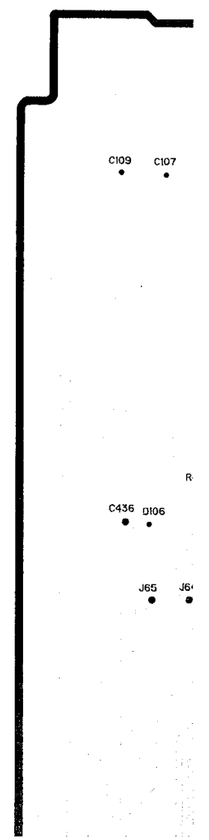


CIRCUIT BOARD (KX-TCM940H-B)

(Component View)

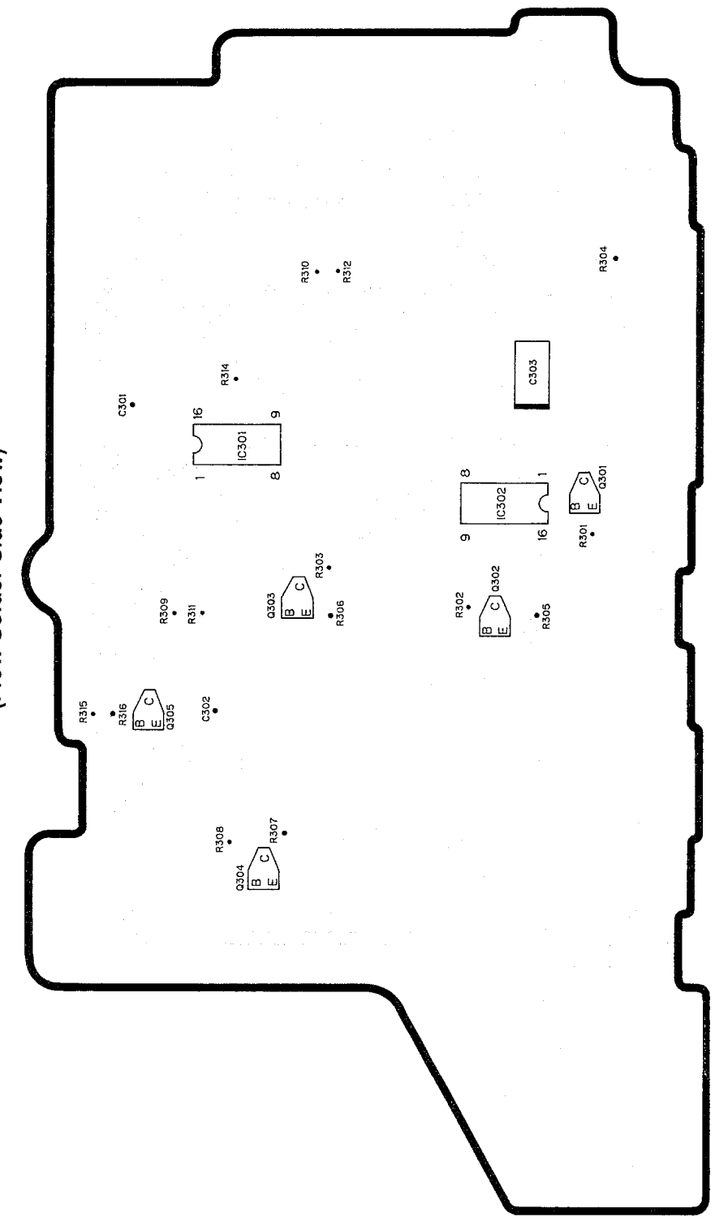


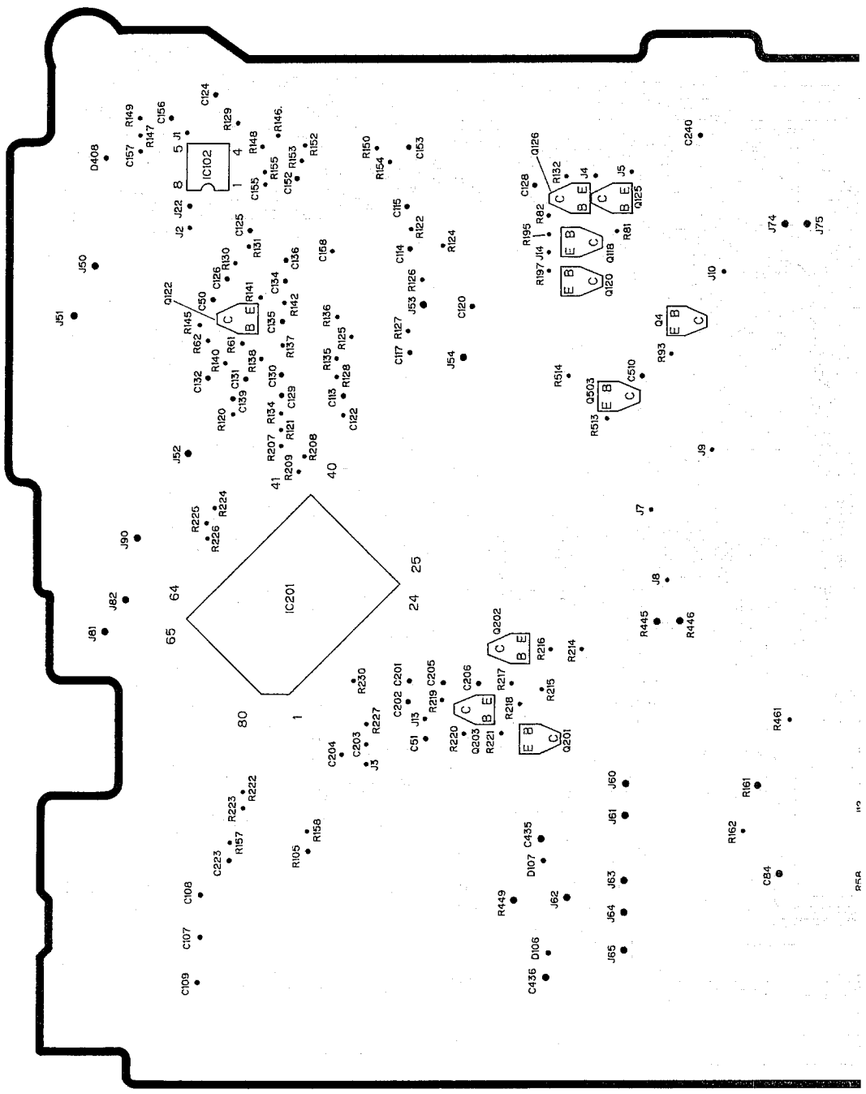


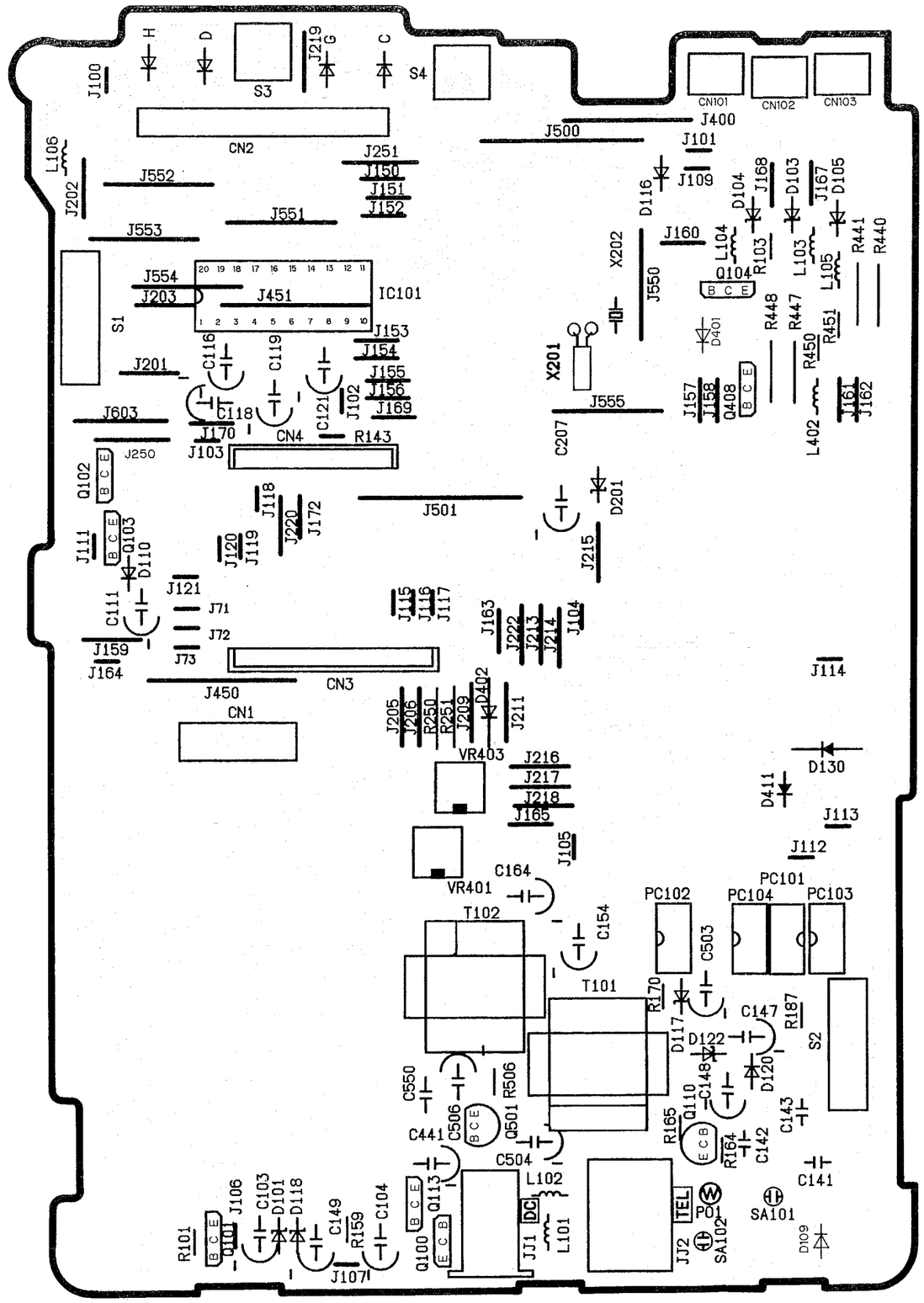


CIRCUIT BOARD (KX-TCM940H-B)

(Flow Solder Side View)



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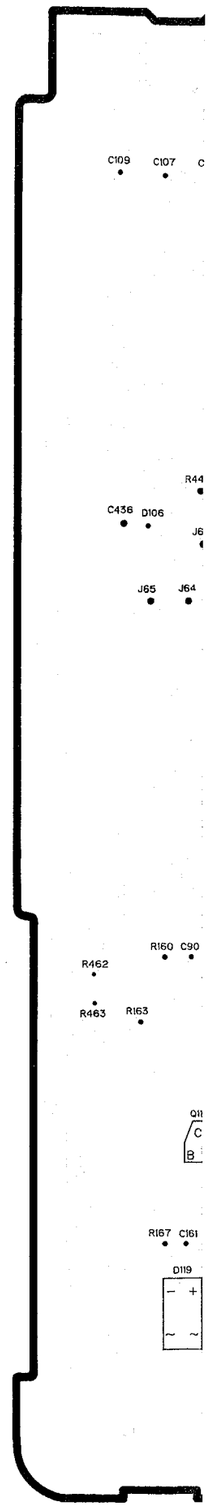
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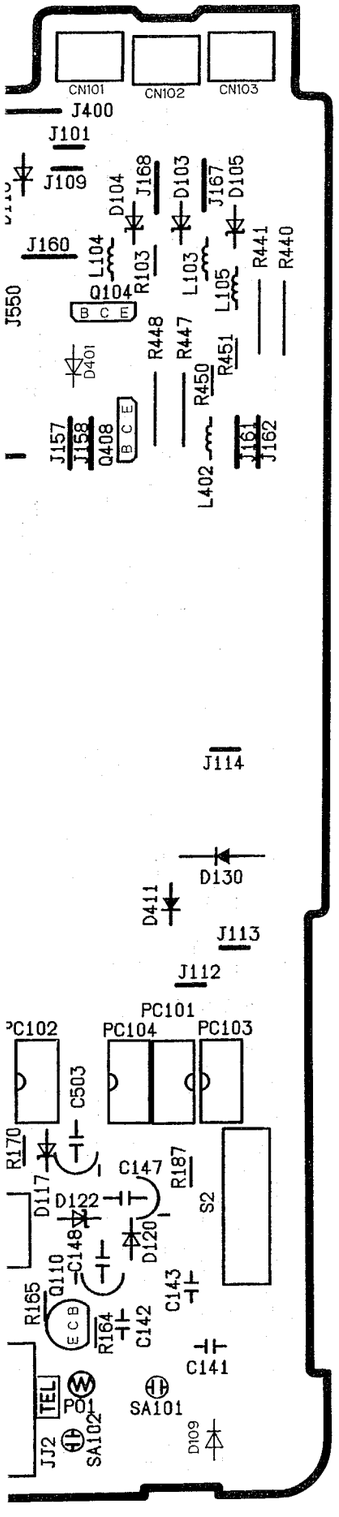
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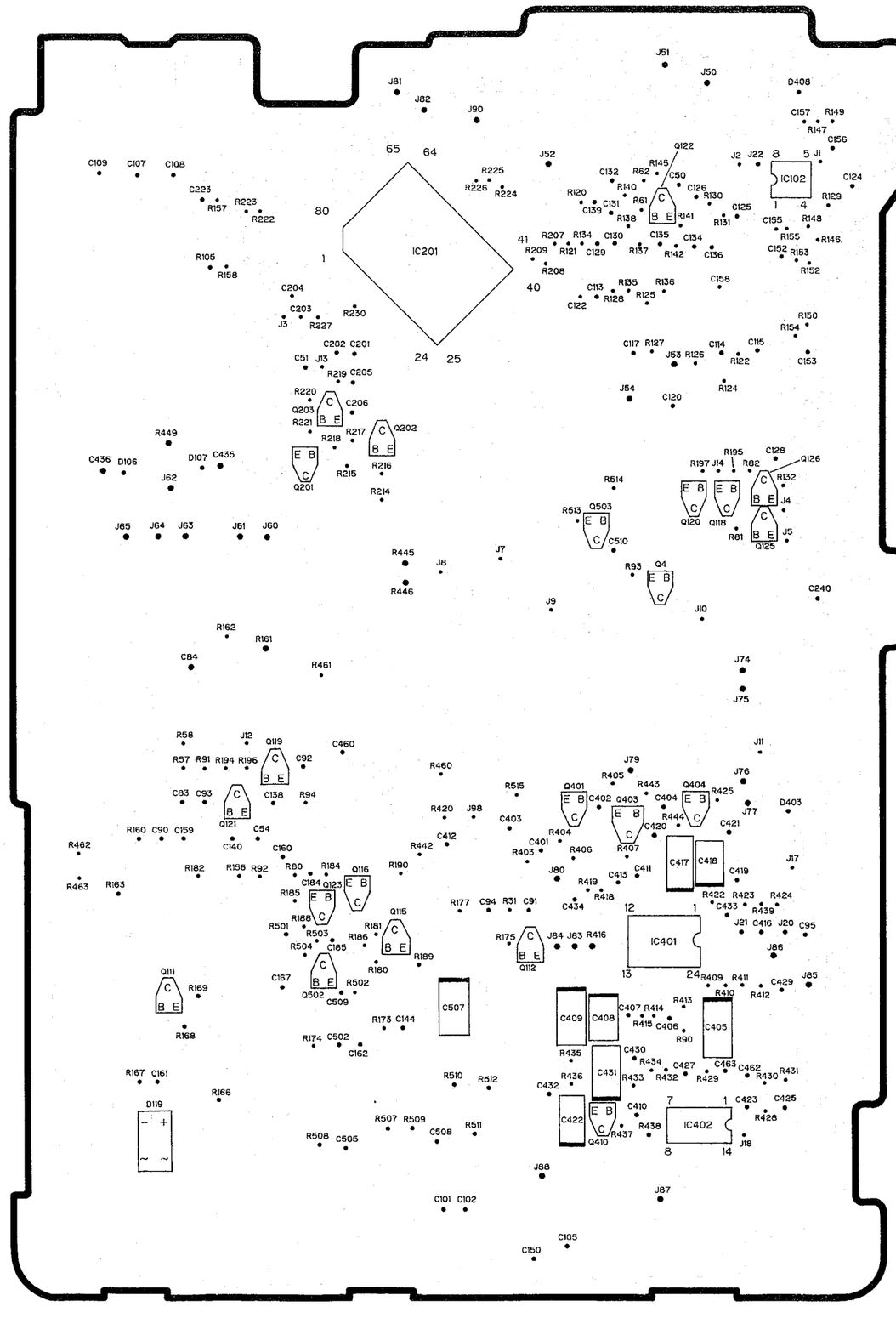
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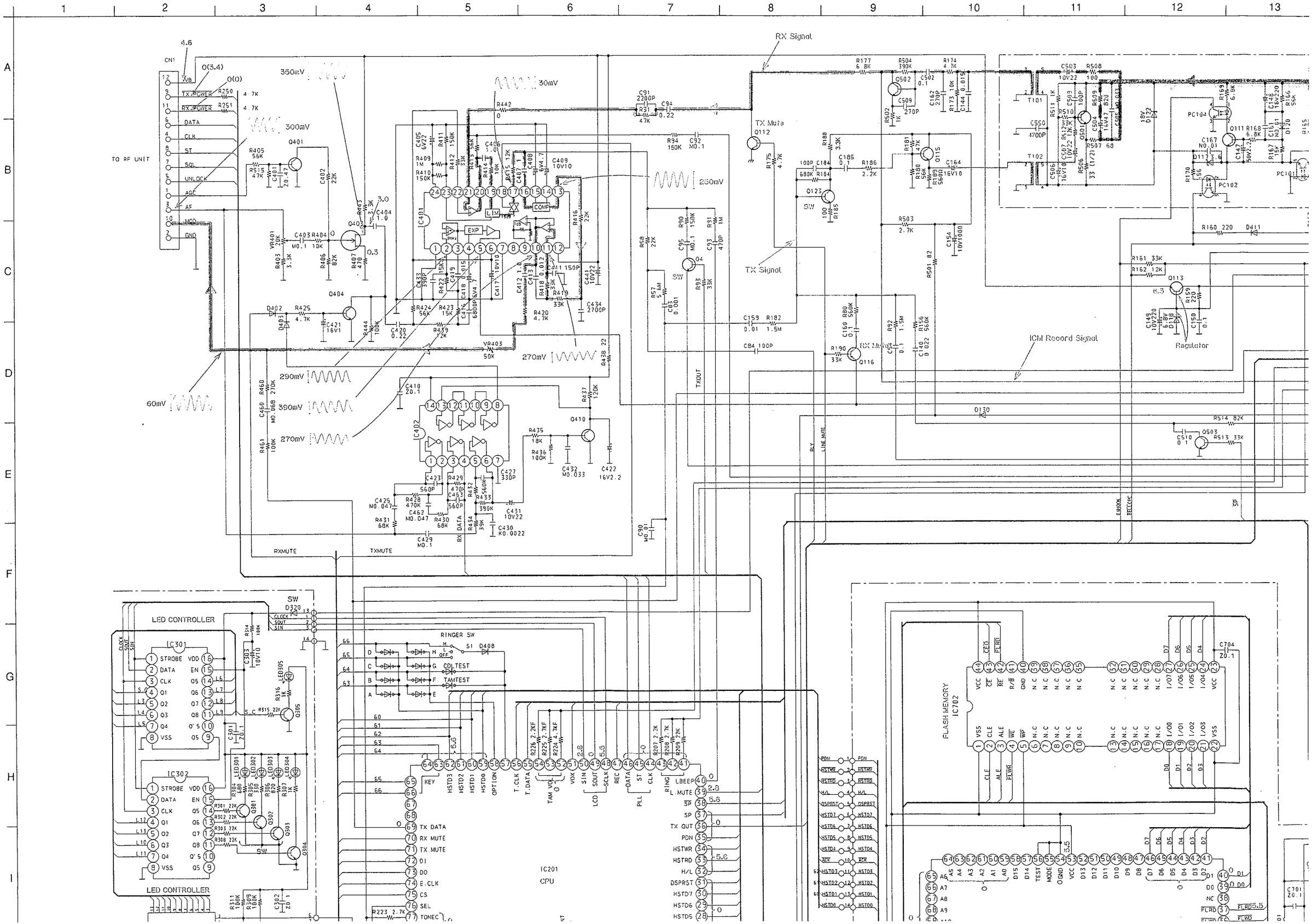
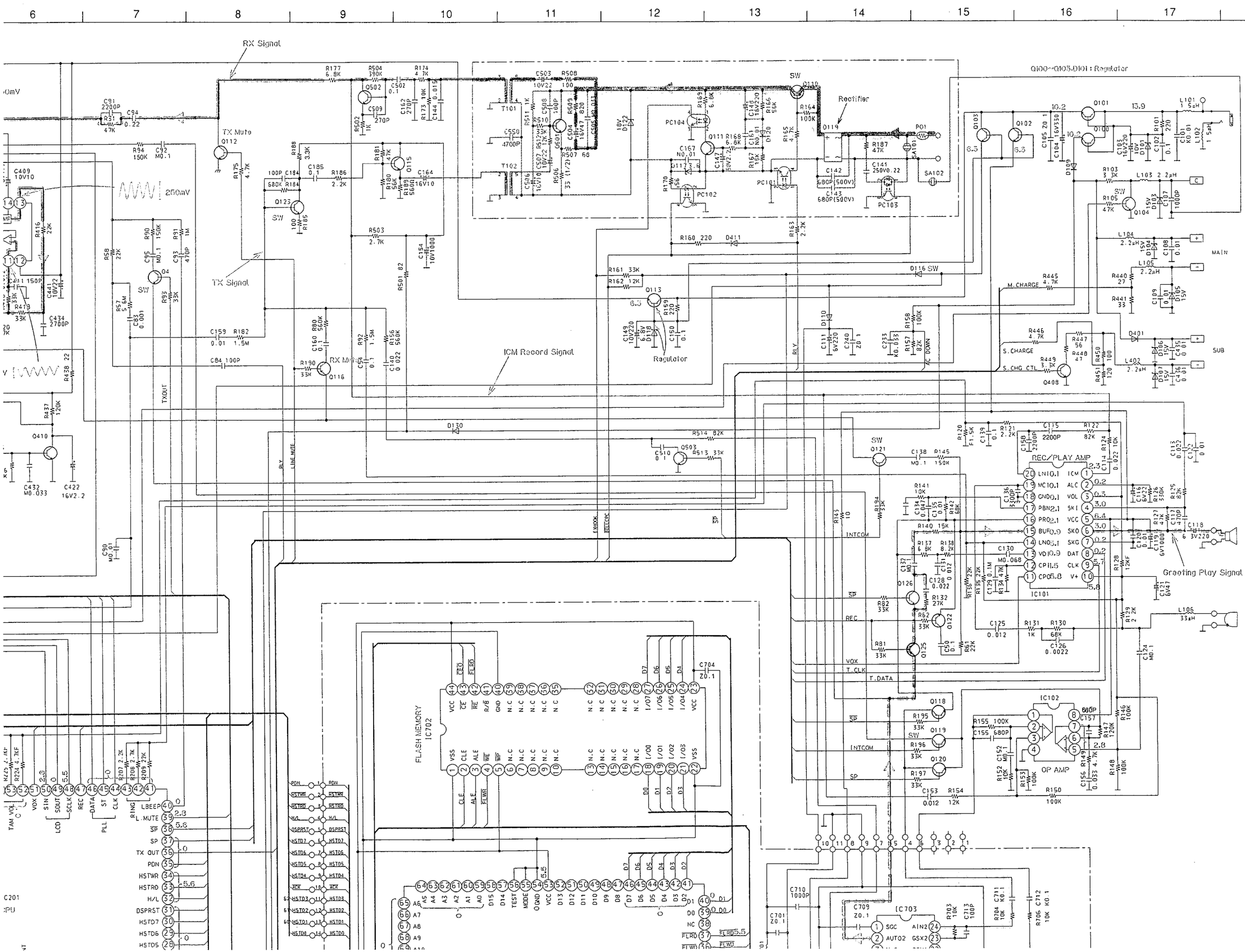
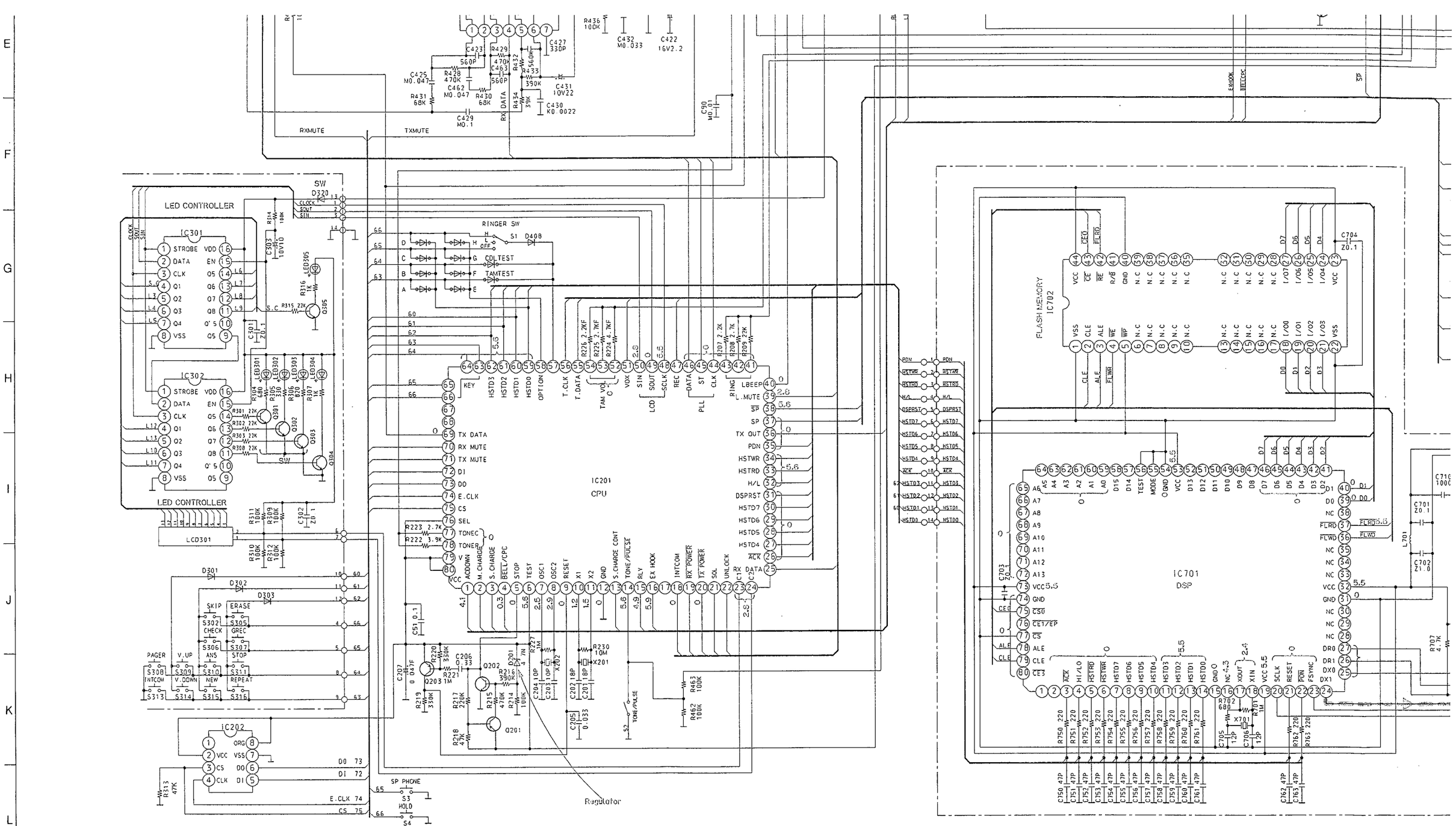
SCHEMATIC DIAGRAM (KX-TCM940H-B)



SCHEMATIC DIAGRAM (KX-TCM940H-B)



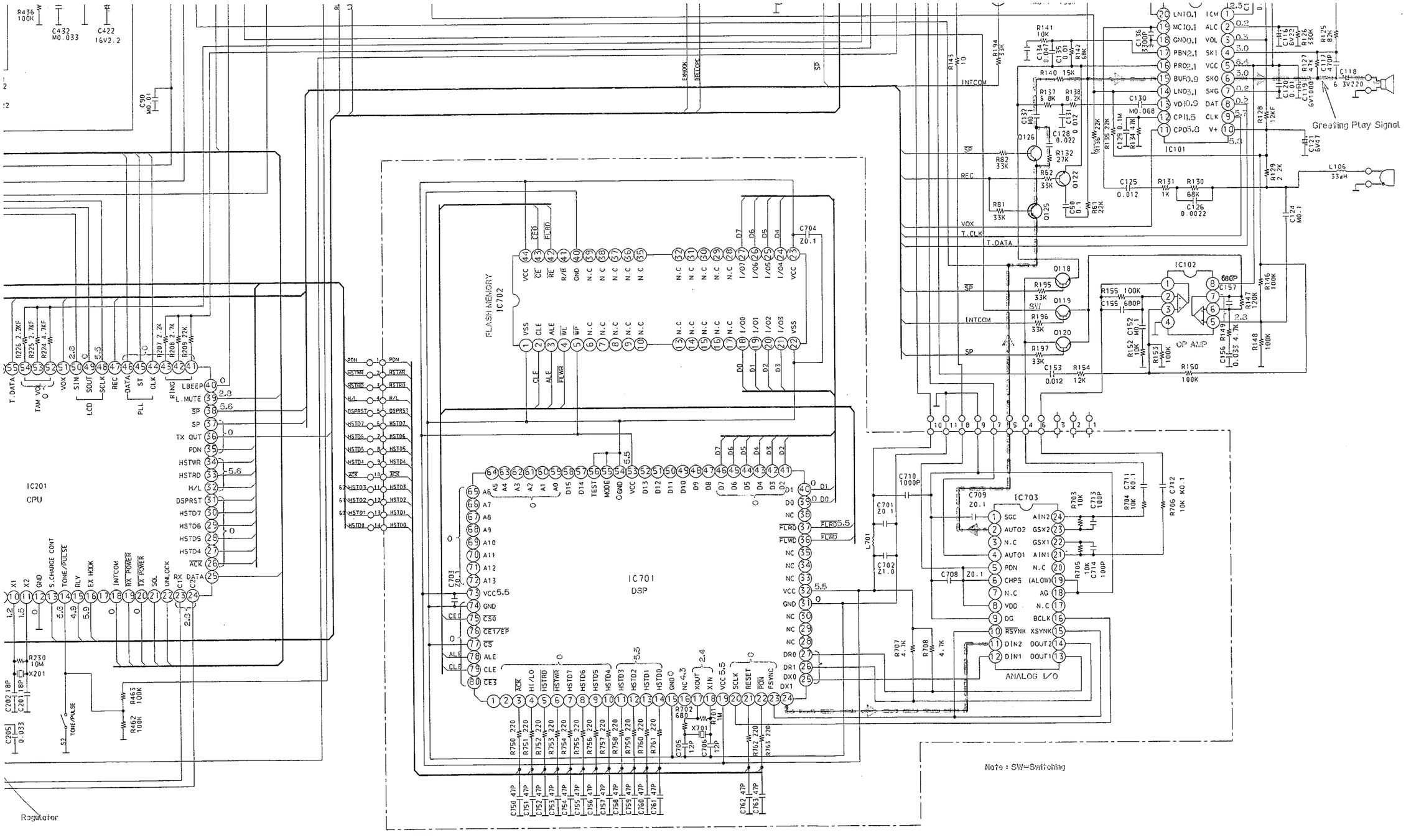


Notes:

1. S1: Ringer Selector Switch
2. S2: Dialing Mode Selector Switch
3. S3: Digital SP-Phone Switch
4. S4: Hold Switch
5. S302: Skip Switch
6. S305: Erase Switch
7. S306: Greeting Check Switch
8. S307: Greeting Record Switch
9. S308: Pager Call Switch
10. S309: FlashVolume (Up) Switch
11. S311: Stop Switch
12. S313: Locator/Intercom Switch
13. S314: Volume (Down) Switch
14. S315: New Message Switch
15. S316: Repeat Switch
16. DC voltage measurements are taken with voltmeter from the negative voltage line.

Important Safety Notice:
The shaded area on this schematic diagram incorporates special features important for protection from fire and electrical shock hazards.
When servicing it is essential that only manufacturer's specified parts be used for the critical components in the shaded areas of the schematic.

**This schematic diag
modified at any tim
development of new**



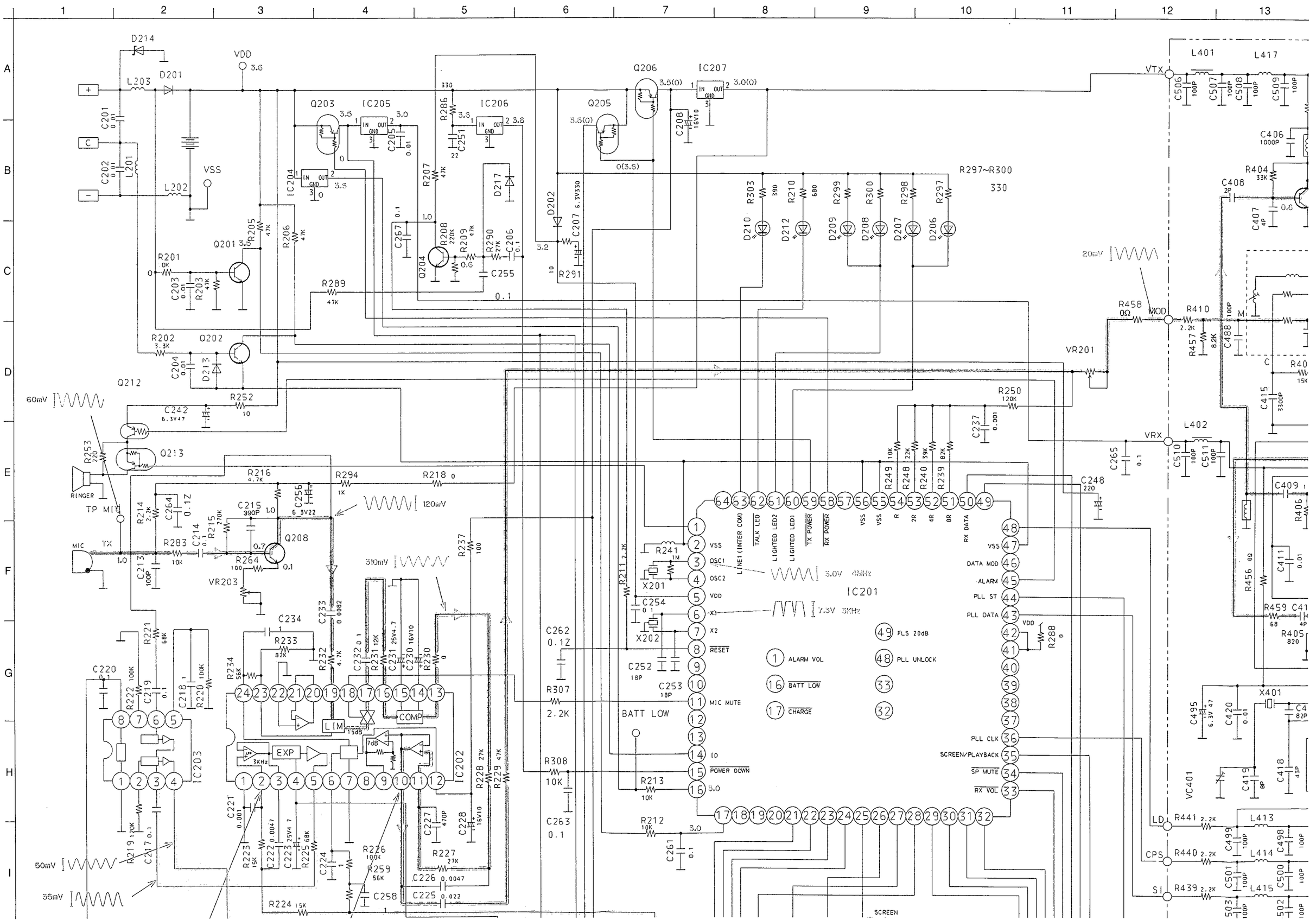
1: Stop Switch
3: Locator/Intercom Switch
4: Volume (Down) Switch
5: New Message Switch
6: Repeat Switch

16. DC voltage measurements are taken with voltmeter from the negative voltage line.

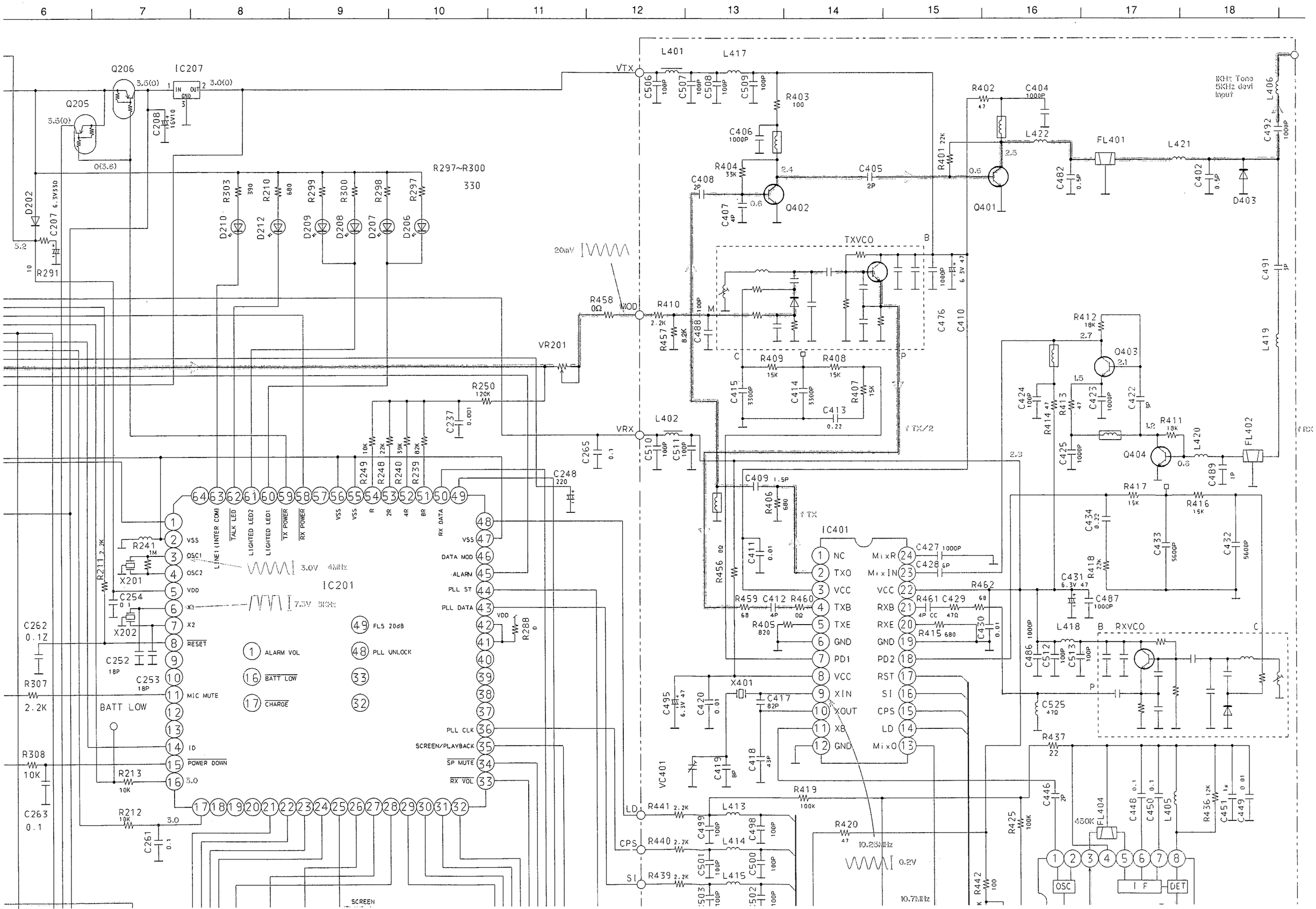
Important Safety Notice:
The shaded area on this schematic diagram incorporates special features important for protection from fire and electrical shock hazards.
When servicing it is essential that only manufacturer's specified parts be used for the critical components in the shaded areas of the schematic.

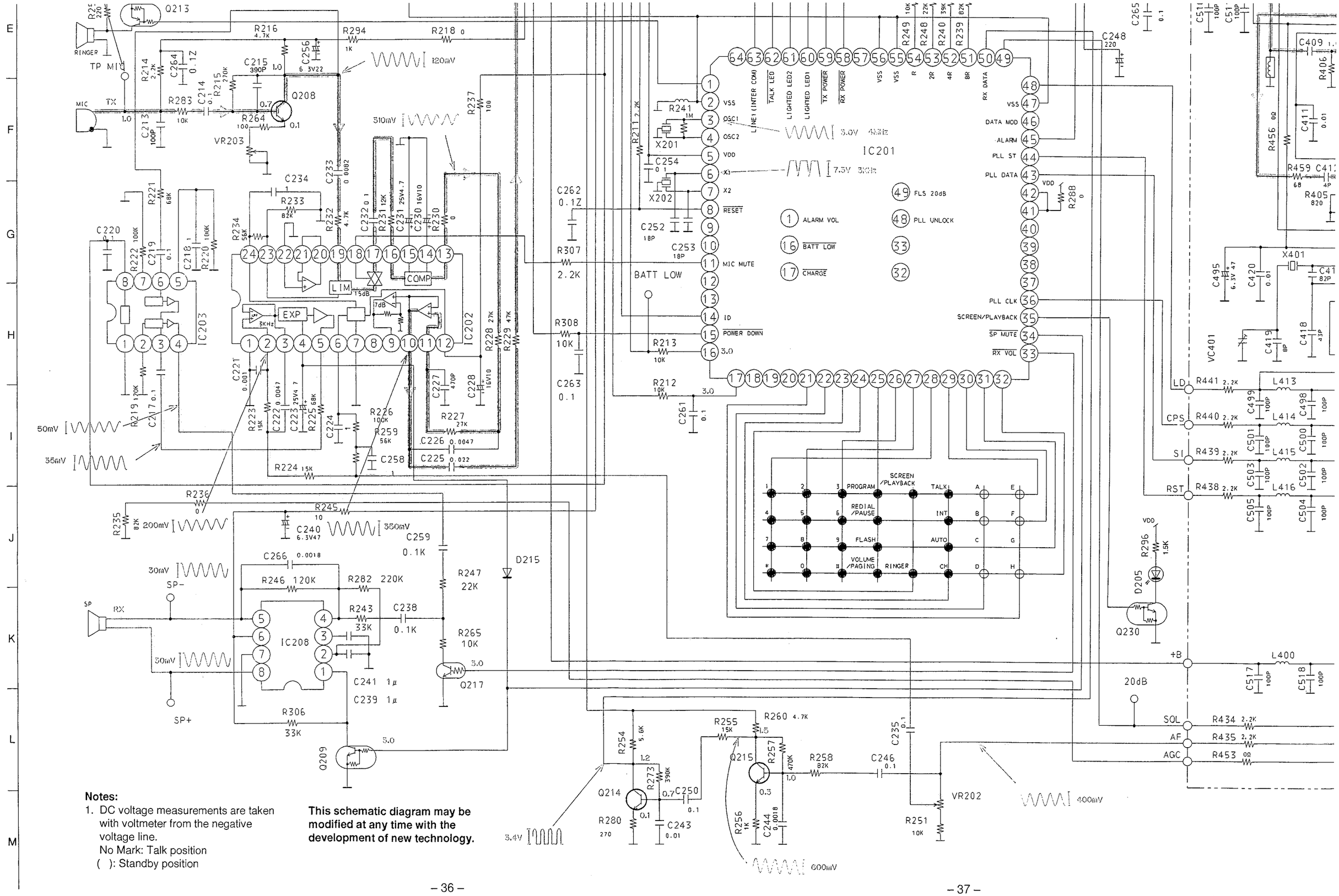
This schematic diagram may be modified at any time with the development of new technology.

SCHEMATIC DIAGRAM (KX-TCM940R-B)



SCHEMATIC DIAGRAM (KX-TCM940R-B)

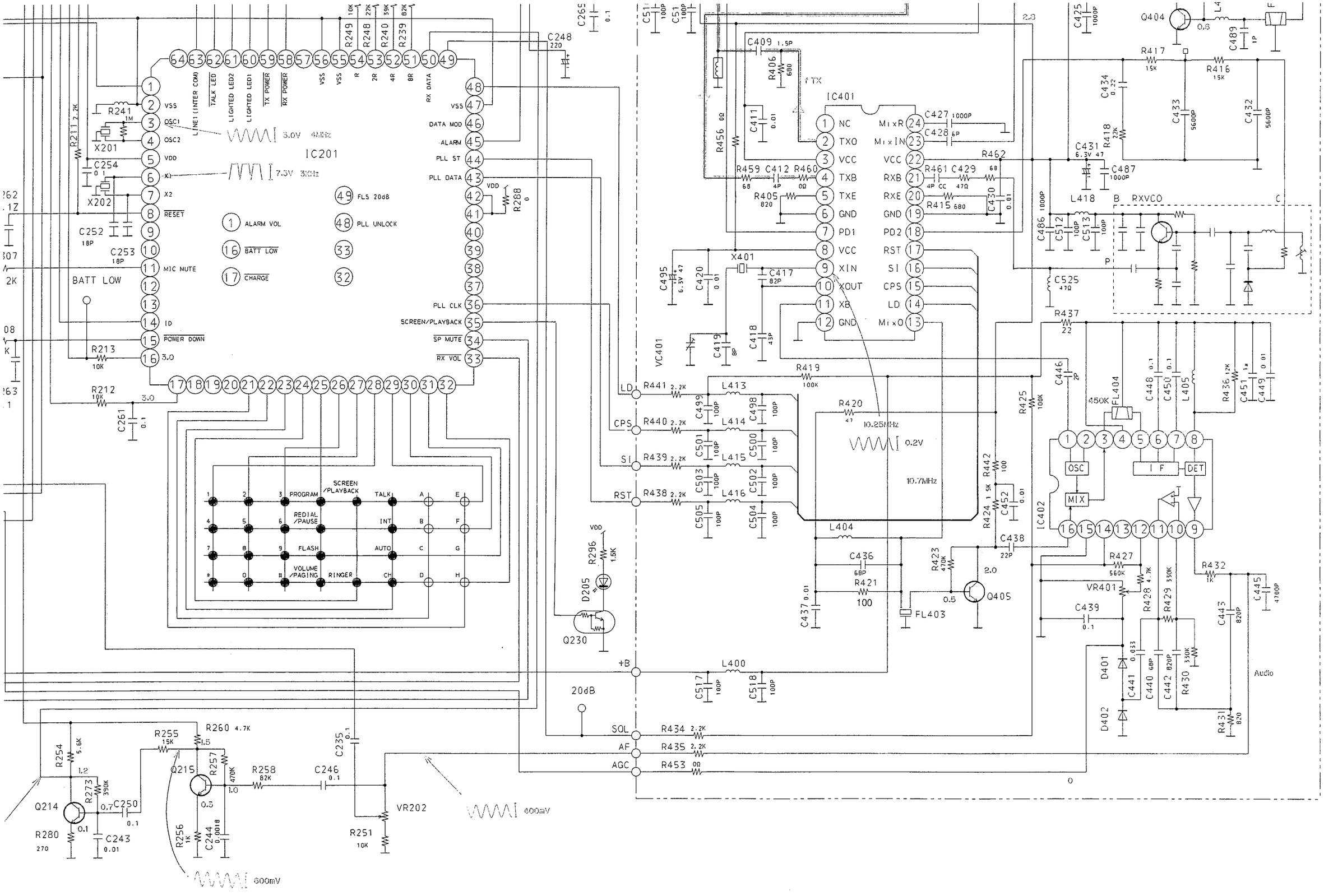




Notes:

1. DC voltage measurements are taken with voltmeter from the negative voltage line.
   No Mark: Talk position
   ( ): Standby position

This schematic diagram may be modified at any time with the development of new technology.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X201
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BATT LOW
ALARM VOL
BATT LOW
CHARGE
FLS 20d8
PLL UNLOCK
MIC MUTE
POWER DOWN
SCREEN /PLAYBACK
PROGRAM
TALK
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Q215
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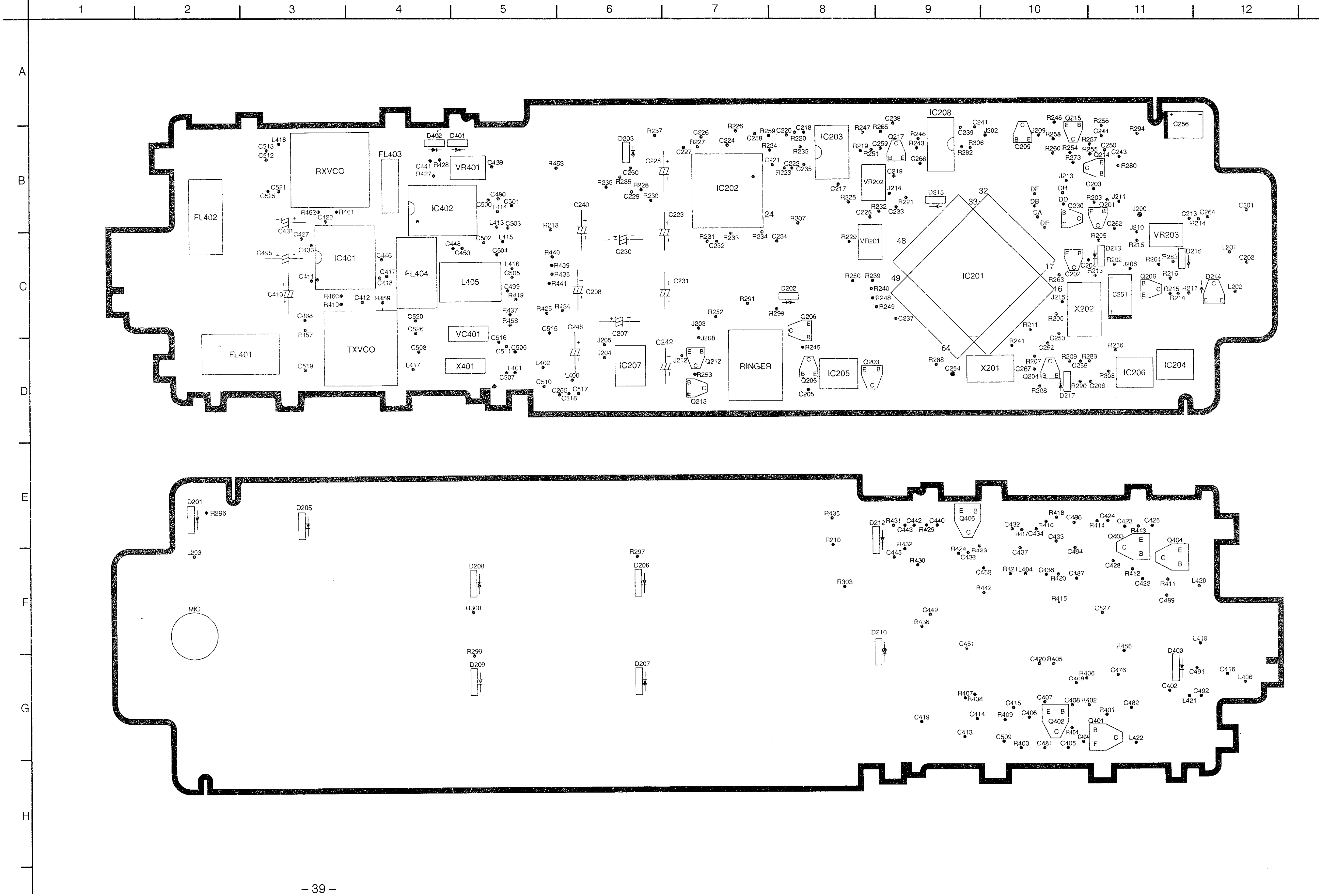
AF
AGC
+B

KX-TCM940-B

CIRCUIT BOARD (KX-TCM940R-B)



BLOCK DIAGRAM (KX-TCM940H-B)

(Main P.C. Board)

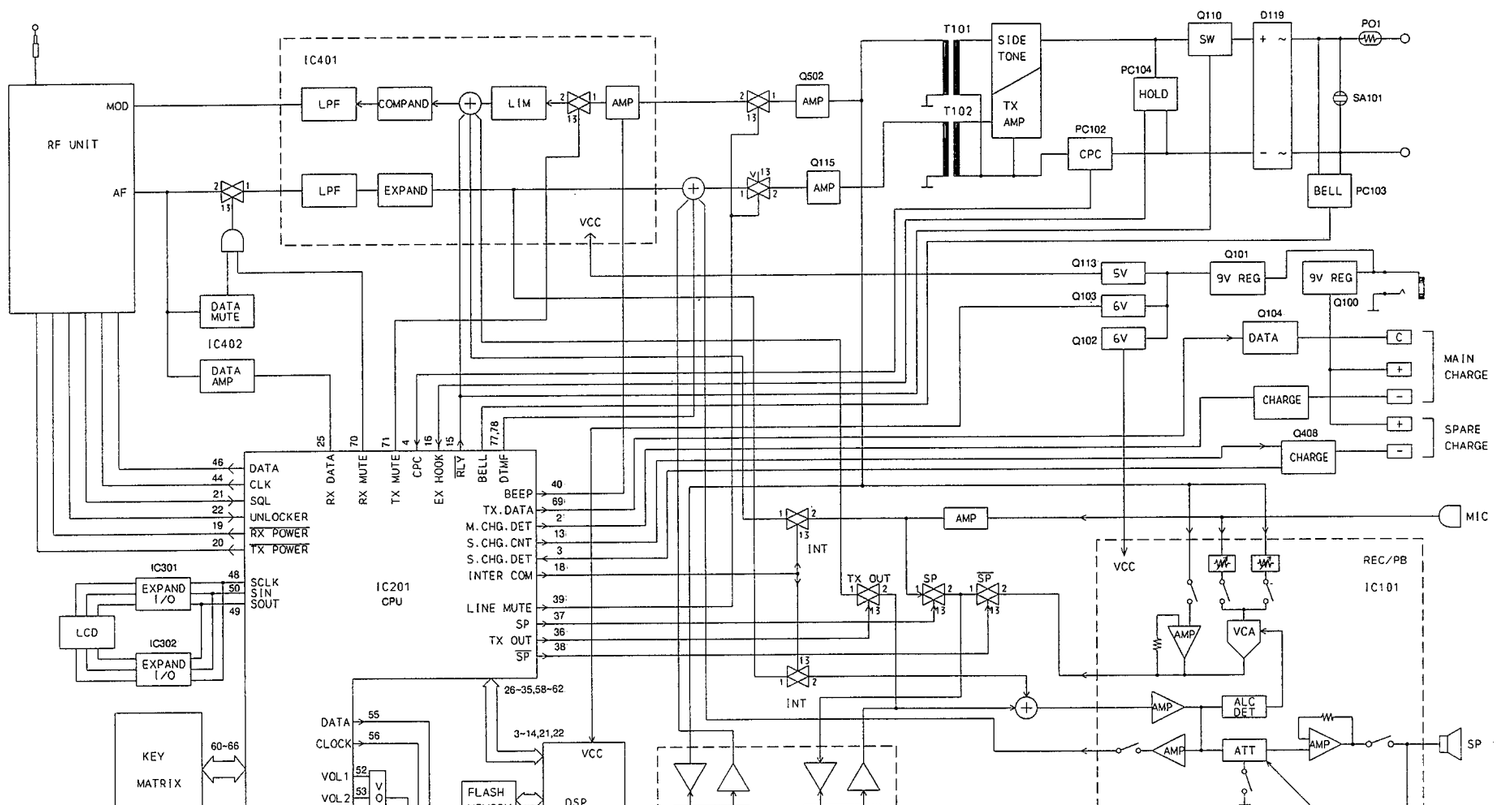


Fig. 27

(RF Unit)

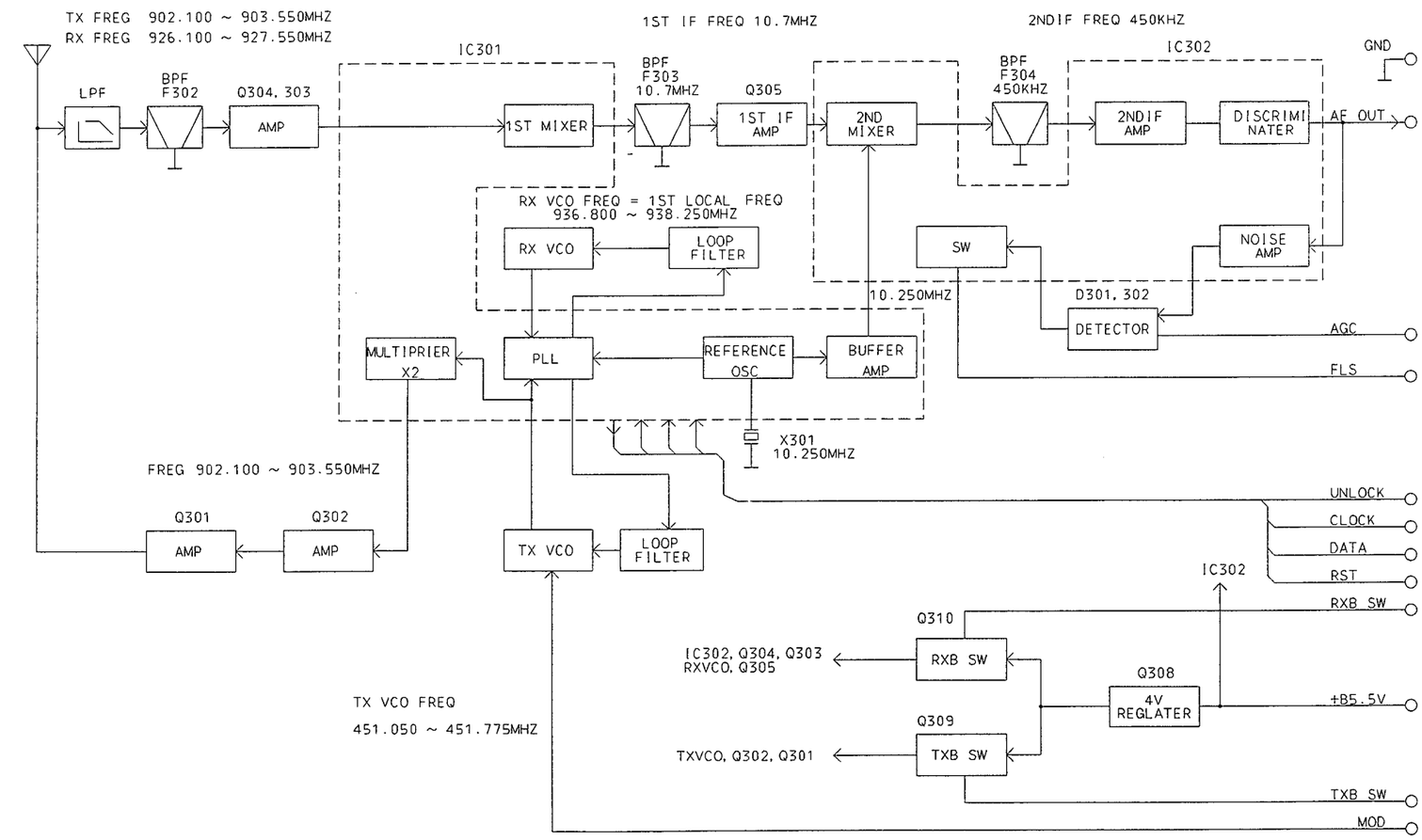


Fig. 28

NEW CIRCUIT OPERATION (KX-TCM940H-B)

■ SP-PHONE RX CIRCUIT

Circuit Operation:
Telephone Line → R508 → C503 → T101 → R174 → C502 → Q502 → R154 → C153 → pin ③ of IC102 → pin ① of IC102 → C712 → R706 → pin ㉑ of IC703 → pin ⑬ of IC703 → pin ㉗ of IC701 → pin ㉔ of IC701 → pin ⑪ of IC703 → pin ② of IC703→ Emitter of Q125 → Collector of Q125 → R132 → C128 → C132 → R140 → pin ⑮ of IC101 → pin ⑥ of IC101 → C118 → Speaker.

Circuit Diagram

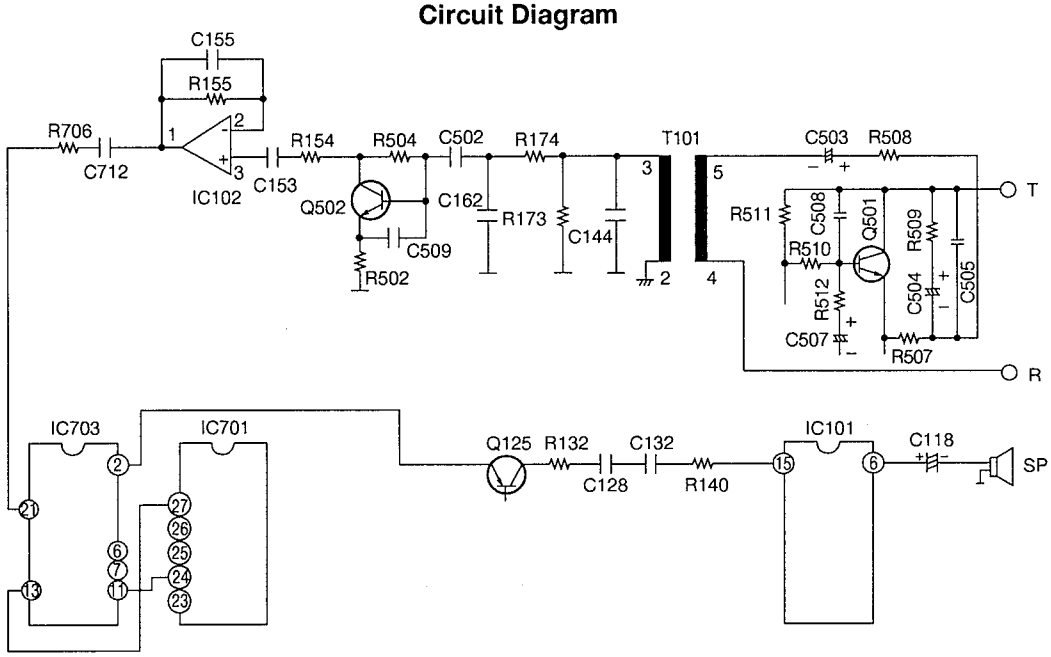


Fig. 29

■ SP-PHONE TX CIRCUIT

Circuit Operation:
MIC → L106 → C124 → pin ⑤ of IC102 → pin ⑦ of IC102 → Emitter of Q120 → Collector of Q120 → C712 → R706 → pin ㉔ of IC703 → pin ⑭ of IC703 → pin ㉖ of IC701 → pin ㉕ of IC701 → pin ⑫ of IC703 → pin ④ of IC703 → R514 → C140 → R156 → Base of Q123 → Collector of Q123 → R186 → C185 → Base of Q115 → Emitter of Q115 → C164 → R178 → T102 → C507 → R512 → Q501 → Telephone Line

Circuit Diagram

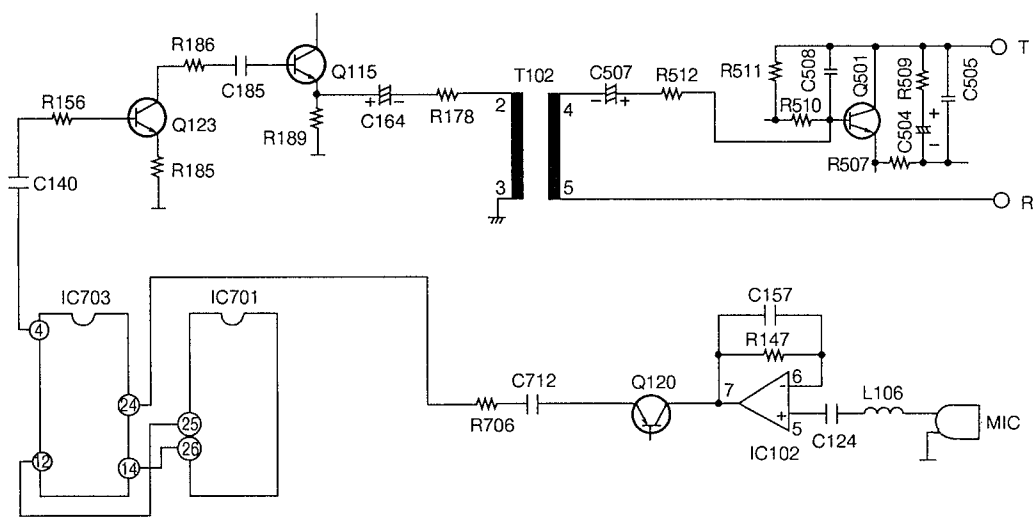


Fig. 30

■ DSP (Digital Speech/Signal Processing) CIRCUIT

General Description:
(IC701~IC703) is a digital speakerphone/speech/signal processing system that implements all the functions of speech compression, record and playback, and memory management required in a digital telephone answering machine.

The DSP system is fully controlled by a host processor (IC201), via 8 bit interface. The host processor provides activation and control of all that functions, such as speech Recording, Playback, Tone detecting and Line Monitoring.

The DSP system comprises of following.

——— a Digital Signal Processor which includes the firmware implemented functions.
——— a Codec (IC703), which is used as the analog I/O interface.
——— a FLASH MEMORY (IC702), which is used for stored voice messages and synthesized voice.

Circuit Diagram

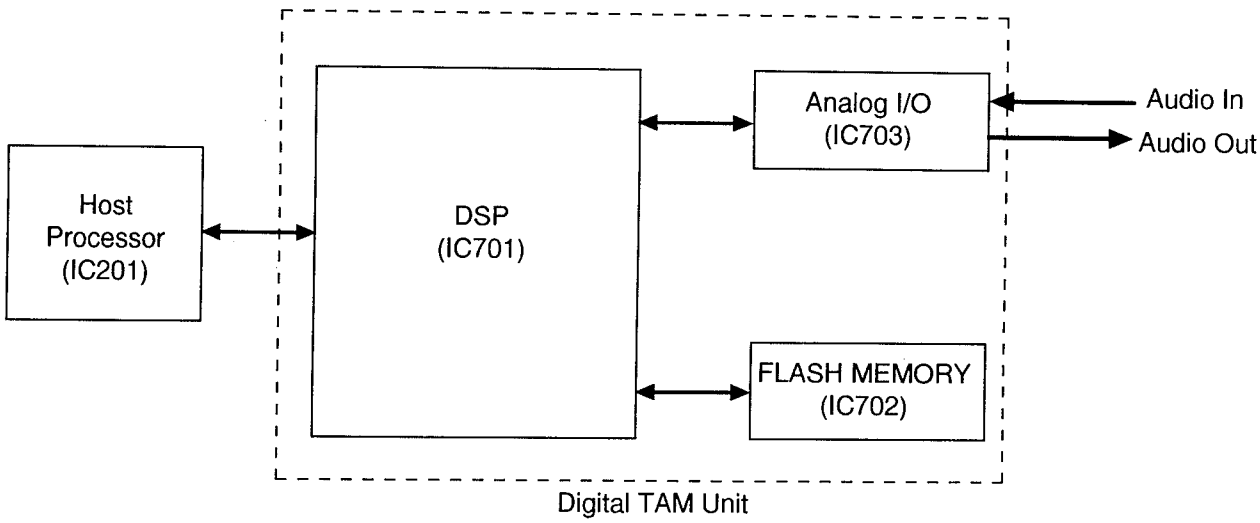


Fig. 31

• Voice Message Recording
The DSP system use a proprietary speech compression technique to record and store voice message in FLASH MEMORY (IC702). An error correction algorithm is used to enable playback of these messages from the FLASH MEMORY (IC702).

• DTMF Detection
The DTMF detection is implemented by the DSP system in software. The DTMF detection is performed during Record, Playback, and Line Monitoring modes of operation.

• Synthesized Voice
The DSP implements synthesized Voice, utilizing the built in speech detector and an FLASH MEMORY (IC702), which stored the vocabulary.

■ GREETING RECORDING CIRCUIT

Circuit Operation:

MIC → L106 → R130 → R131 → C125 → pin ⑲ of IC101 → pin ⑯ of IC101 → Q118 → C711 → R704 → pin ㉔ of IC703 → pin ⑭ of IC703 → pin ㉖ of IC701 (Digital TAM UNIT).

Circuit Diagram

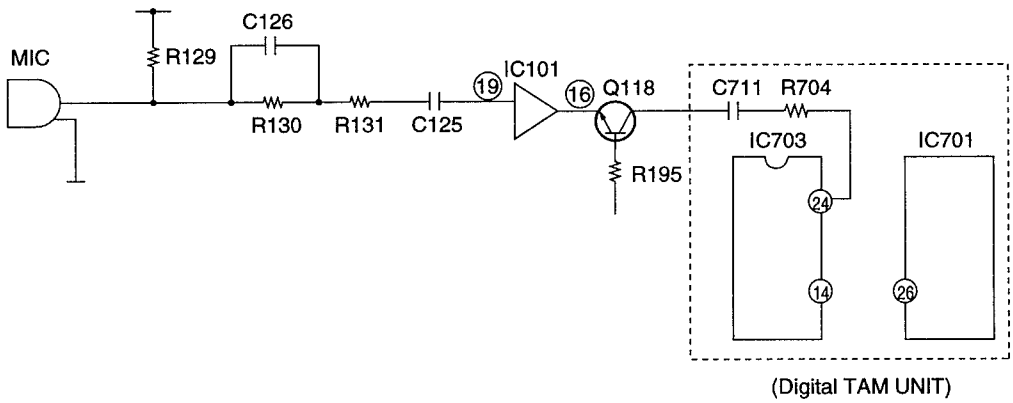


Fig. 32

■ GREETING PLAY BACK CIRCUIT

Circuit Operation:

Pin ㉔ of IC701 → pin ⑪ of IC703 → pin ② of IC703 (Digital TAM UNIT)→ emitter of Q125 → collector of Q125 → emtter of Q126 → collector of Q126 → R140 → C132 → pin ⑮ of IC101 → pin ⑭ of IC101 → C54 → R92 → base of Q123 → collector of Q123 → Base of Q115 → emitter of Q115 → C164 → T102 → Telephone Line.

Circuit Diagram

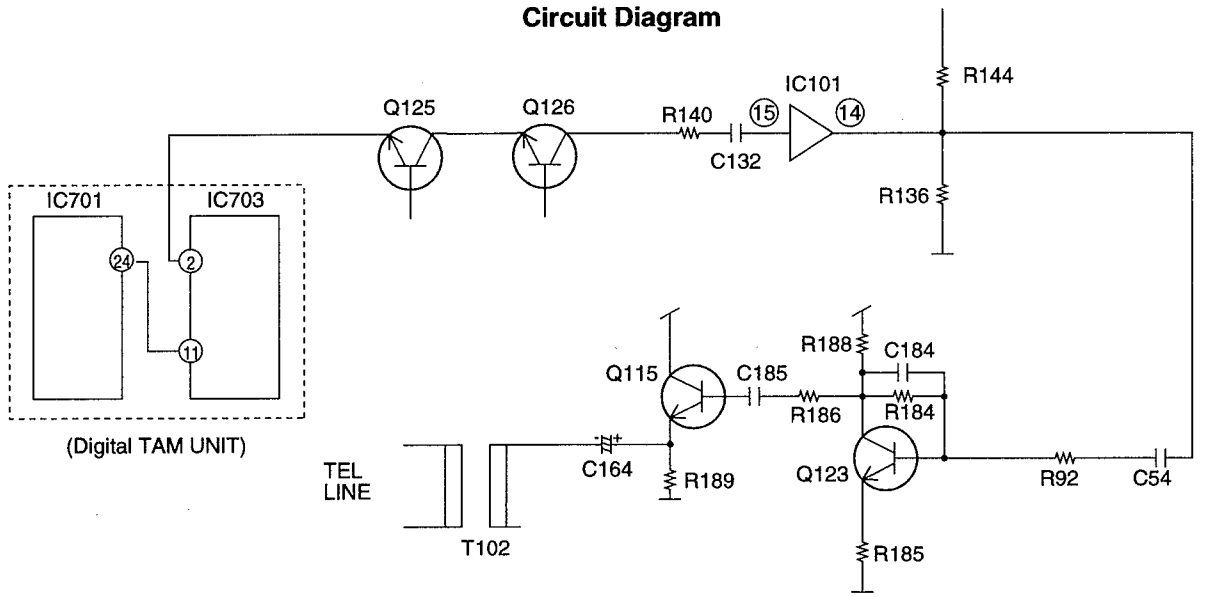


Fig. 33

■ ICM RECORDING CIRCUIT

Circuit Operation:

Telephone Line → T101 → R174 → R122 → C115 → pin ⑳ of IC101 → pin ⑯ of IC101 → emitter of Q118 → collector of Q118 → C711 → R704 → pin ㉔ of IC703 → pin ⑭ of IC703 → pin ㉖ of IC701 (Digital TAM Unit).

Circuit Diagram

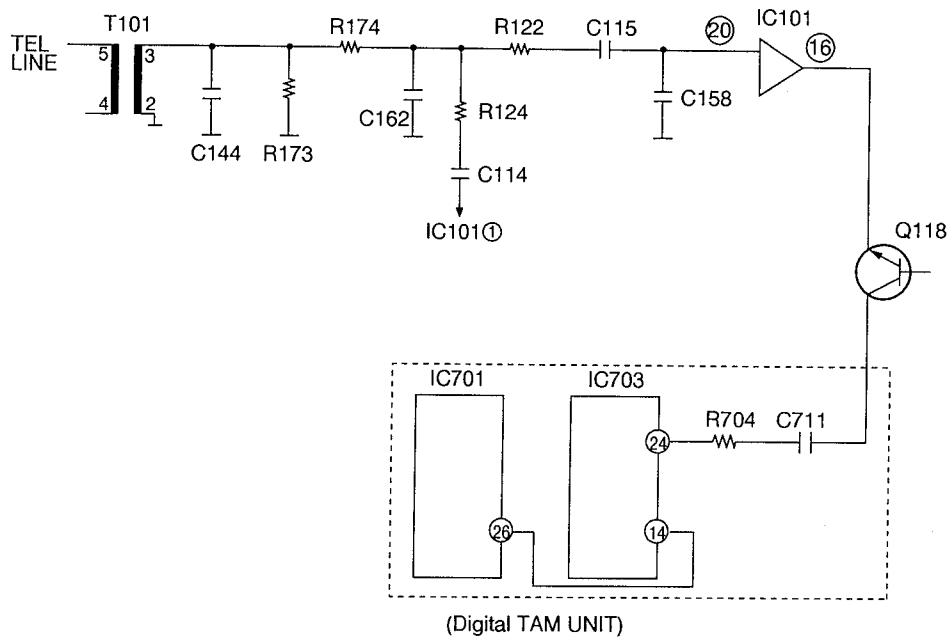


Fig. 34

■ ICM PLAY CIRCUIT

Circuit Operation:

Pin ㉔ of IC701 → pin ⑪ of IC703 → pin ② of IC703 (Digital TAM UNIT) → emitter of Q125 → collector of Q125 → emitter of Q126 → collector of Q126 → C132 → R140 → pin ⑮ of IC101 → pin ⑥ of IC101 → 118 → Speaker.

Circuit Diagram

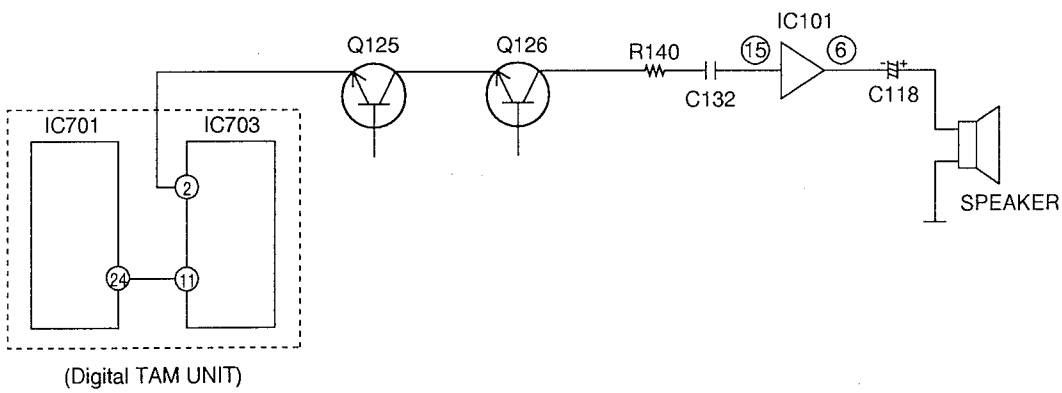


Fig. 35

NORMAL CIRCUIT OPERATION (KX-TCM940H-B)

■ TELEPHONE LINE INTERFACE

Circuit Operation:

● ANSWER

In the idle mode, Q110 is open to cut the DC loop current and decrease the ring load. When ring voltage appears at the Tip (T) and Ring (R) leads (When the telephone rings), the AC ring voltage is transferred as follows:
T→PO1→C141→R187→PC103→IC201 pin ④ .
When the CPU detects a ring signal, Q110 turns on, thus providing an off-hook condition (active DC current flow through the circuit) and the following signal flow is for the voice signal.

T→PO1→D119→Q110→T101 pin ⑤ →T101 pin ④ →D117→D119→R

● ON HOOK

Q110 is open, Q110 is connected as to cut the DC loop current and to cut the voice signal. The unit is consequently in an on-hook condition.

● SPECIFICATIONS

In the on-hook state (idle), the current flows between the telephone line and the unit is as follows:
T→C141→R187→PC103→R
The DC component is blocked by C141: thereby providing an on-hook condition.
The AC interface impedance is over 47 kΩ; thus, satisfying the telephone company requirements.

Circuit Diagram

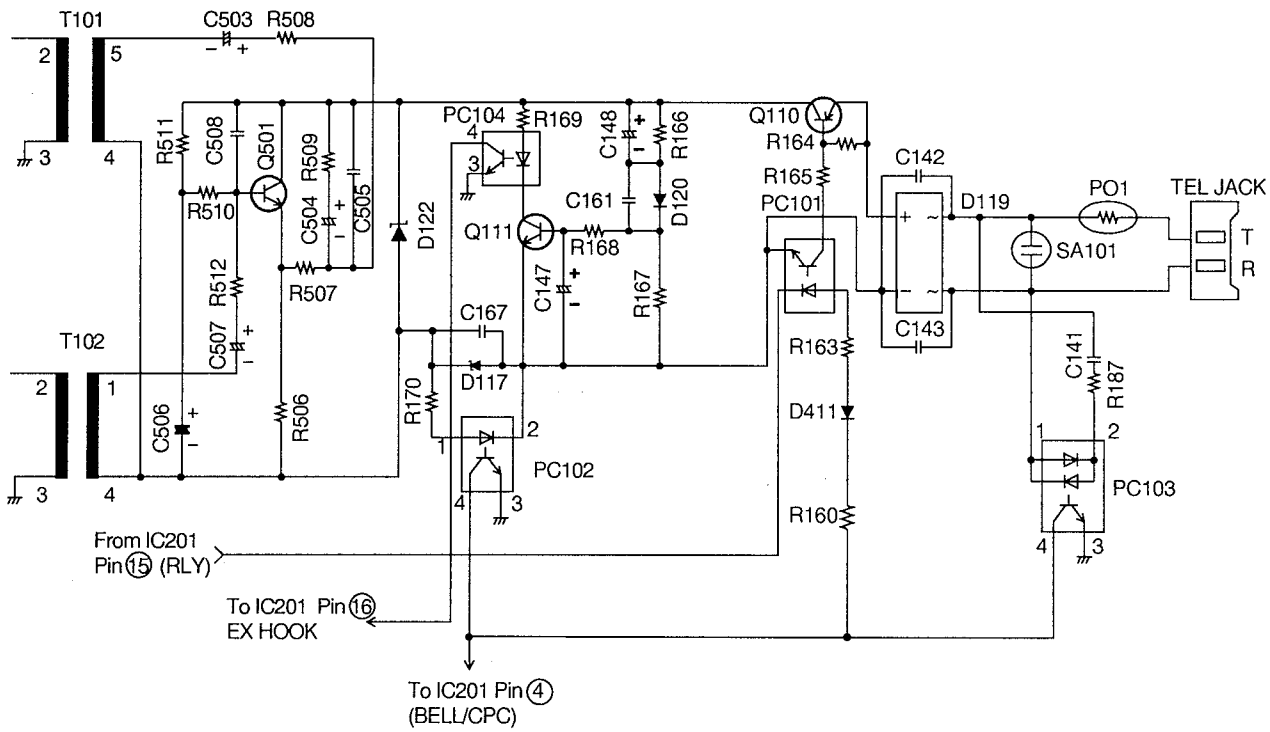


Fig. 36

■ INTERCOM MODE

1) When the base unit LOCATOR/INTERCOM button is pressed, a call monitor signal (intercom sound) is output from pin ㊸ of IC201 becomes "LOW". Thus a monitor tone is heard from the speaker.

2) At the same time, pin ⑳ of IC201 goes "Low", and the transmission state is reached. Then the modulated data signal is output from pin ㊾ of IC201. Flashing of the IN USE/CHARGE (LED304) is obtained from pin ⑪ of IC302. This status is called "Intercom stand-by".

3) The receiving signal flows:
RF→ pin ③ of CN1→ VR401→ Q403→ C404→ R439→ pin ② of IC401→ pin ⑤ of IC401→ Q121 (pin ⑱ of IC201 Low→ High)→ C138→ R145→ pin ⑮ of IC101→ pin ⑥ → SP

4) The transmission signal flows:
MIC→ IC102 (Amp) [pin ⑦ is outputted]→ Q119 (Pin ⑱ of IC201 Low → High)→ C92, R94→ pin ㉑ of IC401→ pin ⑳ of IC401→ pin ⑲ of IC401→ pin ⑰ of IC401→ pin ⑯ of IC401→ pin ⑬ of IC401→ R416→ R419→ pin ⑪ → pin ⑩ → R420→ VR403→ pin ⑩ of CN1→ RF

■ LINE SENDING SIGNAL

The AF signal output from the AF terminal of the RF unit is adjusted to the appropriate level by VR401, amplified by Q403, and input to IC401. The RX DATA signal from the portable handset is muted at this point by Q404 to prevent the RX DATA from leaking onto the line.Also, the DC signal from the RF unit's noise detector comes to Q403. If there is a lot of noise due to a weak signal, the gain of Q403 is reduced, and when there is no noise, standard gain is used. In this way the noise is suppressed. IC401 comprises a 3 kHz LPF and an expander IC. The signal compressed by the portable handset is expanded, recreating it as a normal signal. The output from the expander passes through amplifier Q123 and buffer amplifier Q115 before being input to line transformer T102. In the speakerphone mode, the signal is supplied from pin ④ of IC703 to Q123.

Circuit Diagram

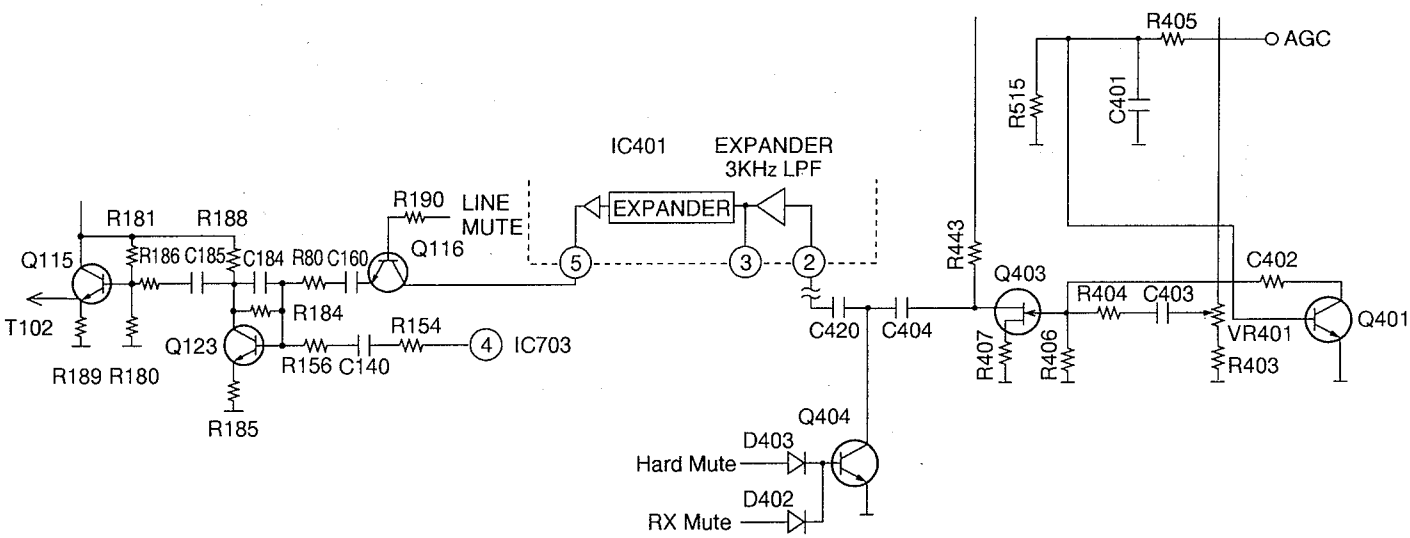


Fig. 37

■ LINE RECIEVING SIGNAL

The audio signal from line transformer T101 is amplified by Q502 and input to IC401. IC401 comprises an amplifier, limiter, mute circuit, compander, and 3 kHz LPF. It performs signal processing. The audio signal output from pin ⑩ of IC401 is mixed with the DTMF, TX DATA, and TR RLY signals. At this point (in the talk mode), the DTMF tones, pulse dial tones, and data transferred between the portable handset and base unit is input to the modulator circuit.

Circuit Diagram

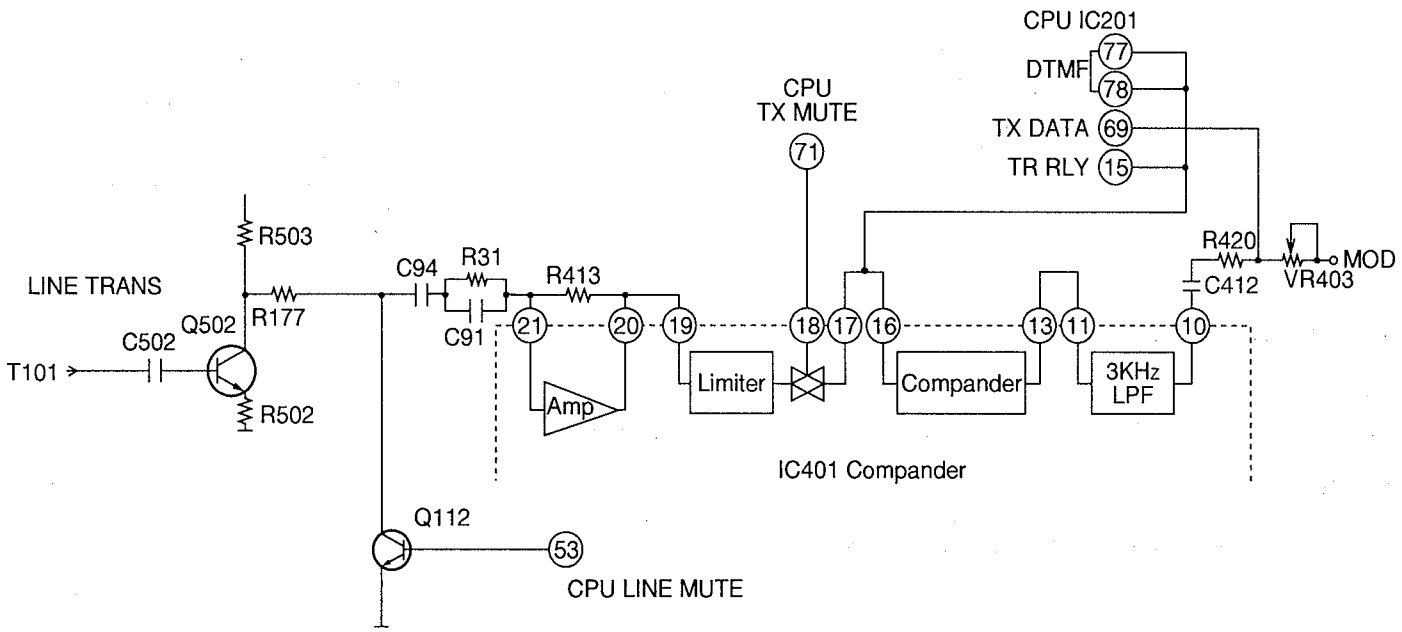


Fig. 38

■ RX DATA CIRCUIT/HARD MUTE CIRCUIT

The AF signal output from the RF unit is filtered and amplified by a filter amplifier with a 500 Hz cutoff connected to pins ① through ④ of IC402. The resulting demodulated data waveform is then input to RX DATA pin ㉕ of the CPU.
If there is data from the portable handset during talk operation, the portable handset data is as shown below to prevent the data from leaking onto the line. Hardware muting is applied as the leading edge of the data as soon as the data arrives. After this, muting is applied by the CPU.

Timing Chart

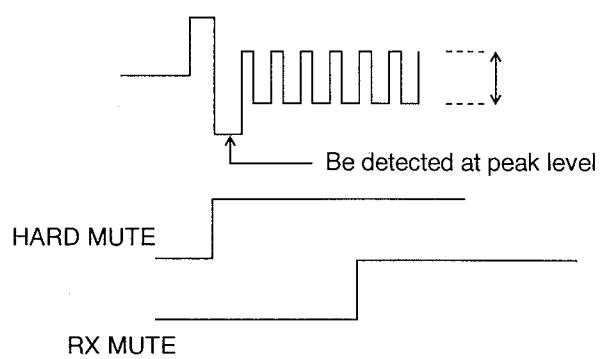


Fig. 39

Circuit Diagram

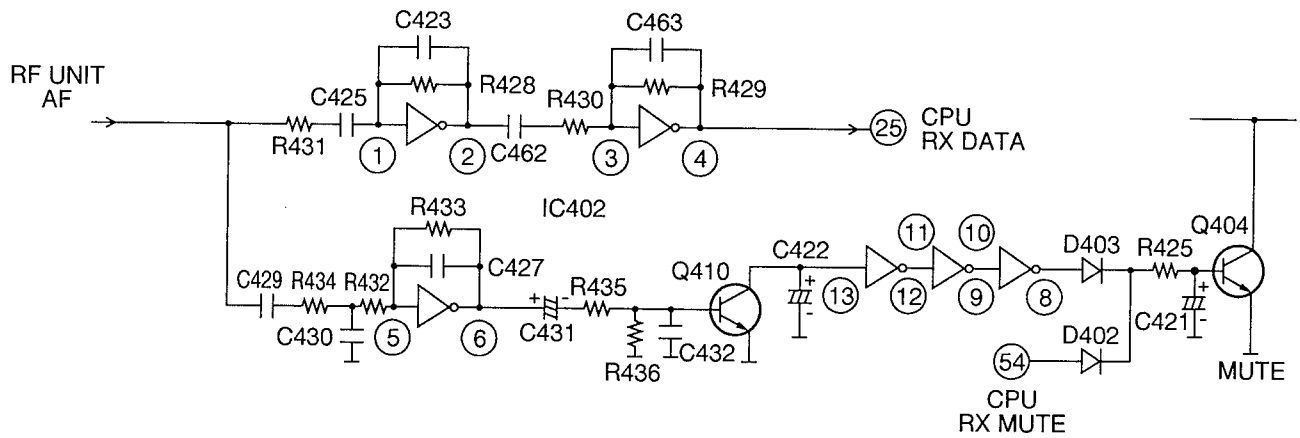


Fig. 40

■ INITIALIZING CIRCUIT

Function:
This circuit is used for to initialize the microcomputer when it incorporates an AC adaptor.

Circuit Operation:
When the AC Adaptor is inserted into the unit, then the voltage is shifted by D116 and power is supplied to the CPU.
The set can operate beyond point Ⓐ in the circuit voltage diagram.

Circuit Diagram

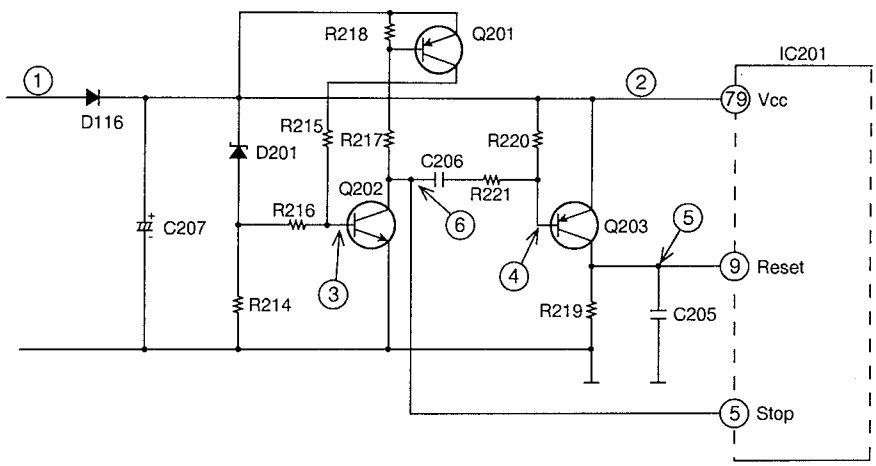


Fig. 41

Circuit Voltage

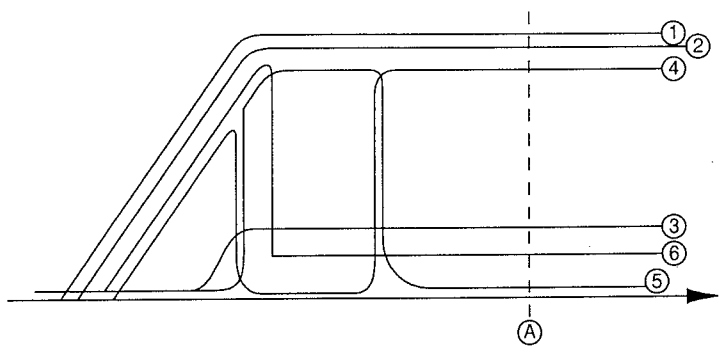


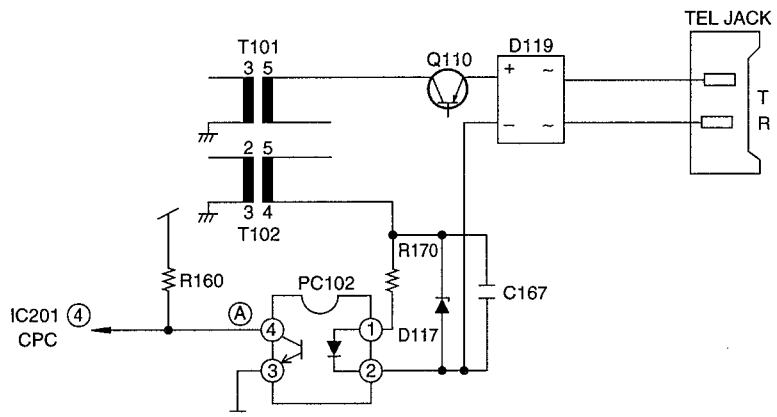
Fig. 42

■ CPC (CALLING PARTY CONTROL) DETECTOR CIRCUIT

Function:
The CPC DETECTOR complements the units shut off, in the ANSWER mode, after the caller hangs up. At this time, the CPC DETECTOR takes over.
The CPC DETECTOR senses the temporary disconnection of the telephone line which occurs after the caller hangs up.

Circuit Operation:
When off-hook, the DC current of telephone line flows as follows:
T→D119→T101→T102→R170→PC102→D119→R
When in the off-hook mode, the collector of PC102 is at Low level.
If an instant break down of the telephone line occurs, the collector of phototransistor goes to a high level from a low level.
(The CPC detector is designed for the instant break down of more than 8 msec. or 600 msec.)

Circuit Diagram



CPC Function

	A	B
OK	more than 8 ms	more than 600 ms
NG	less than 5 ms	less than 350 ms

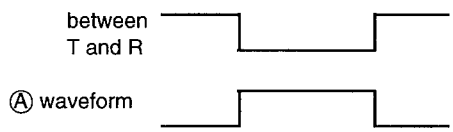


Fig. 43

■ DTMF SIGNAL

When the DTMF data from the portable unit is received, the DTMF signal is output from pins ⑦⑦ , ⑦⑧ of the CPU and sent to the line through Q123, Q115.

■ ID CODE SETTING

When the portable handset is placed on the base unit, the charge detector operates and ID data is output from pin ⑥⑨ of the CPU. After passing through data amplifier Q104 and the charge terminal, the data is sent to the portable handset.

■ AUTO DISCONNECT CIRCUIT

Function:
This circuit is used to detect the fact that another telephone connected to the same line is OFF-HOOK while the unit is in a receiving status or OGM transmitting status.

Circuit Operation:
T → PO1 → D119 → Q110 → C148 → D120 → R168 → Q111. During this interval C147 charges and the base of Q110 becomes High, causing Q110 to go ON.
If a parallel-connected telephone is put into an OFF HOOK status, charge ceases to flow to C148, and the base of Q110 becomes Low, causing Q110 to go OFF.
However, the system is designed so that if the voltage fluctuation is small, the charging and discharging of C147 has no effect on the system.
When a line is connected, Q110 goes ON, causing pin ⑯ of IC201 to go low. When the line is disconnected, Q110 goes off, causing pin ⑯ of IC201 to go high.

Circuit Diagram

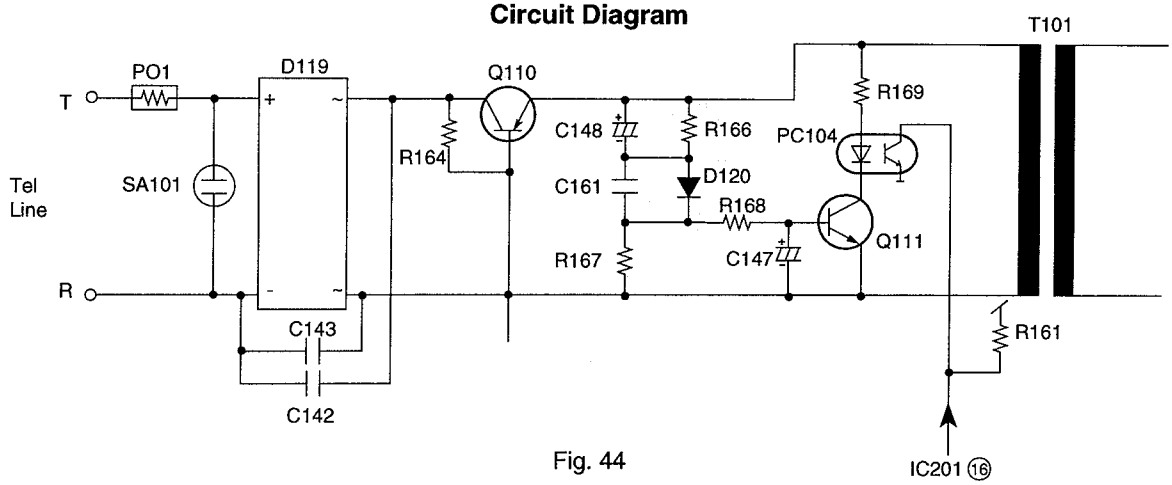


Fig. 44

■ POWER SUPPLY CIRCUIT

Function:
Power from the AC adaptor passes through a 5-stage regulating block consisting of Q100 ~ Q103, Q113 and provides system voltages of 6.3 V and 10 V.

Circuit Operation:
Q101 and Q100 is a regulated power supply. The voltage at point Ⓐ is regulated to 10 V by the zener voltage of D101. Q103, Q102, Q113 is a regulated power supply.
The voltage at point Ⓑ is regulated to 6.3 V by the zener voltage of D118. The 6 V voltage is dropped by D116 to 5.4 V.

Circuit Diagram

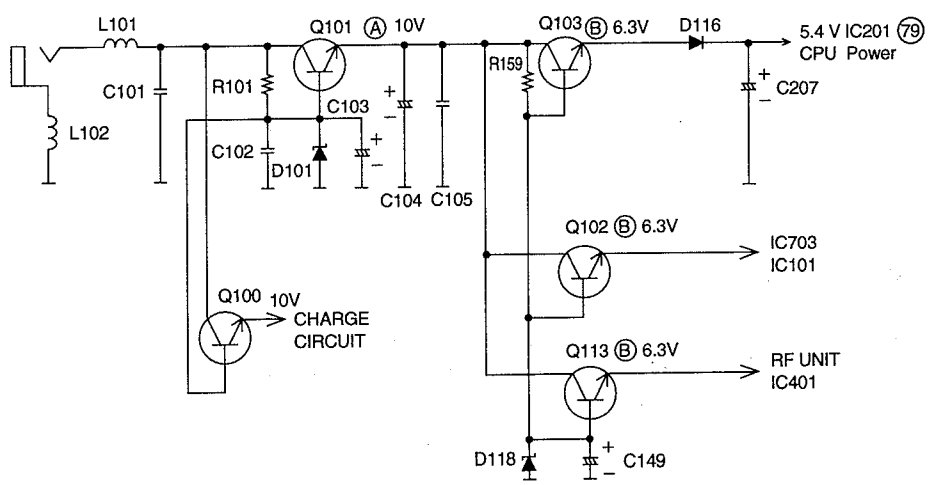


Fig. 45

RF UNIT

■ PLL CIRCUIT

The PLL IC comprises two PLL blocks, one for transmission and one for reception, a transmission multiplier circuit, and a reception first mixer circuit.
The 900 MHz band frequency from the RX VCO, the 450 MHz band frequency from the TX VCO, and the 10.25 MHz reference oscillator frequency are frequency divided by a frequency divider controlled by the CPU to create the 12.5 kHz comparison frequency.
The phase comparator determines the phase difference between the TX and RX frequencies and the reference frequency, and supplies a control voltage via pin ⑦ or pin ⑱ to the appropriate VCOs so that the desired TX and RX frequencies are maintained.
The output from the TX VCO is multiplied by 2 internally by the IC, resulting in a 900 MHz band signal that is then output to pin ② .
Also, the RX VCO signal is supplied to the first mixer built into the IC.

Circuit Diagram

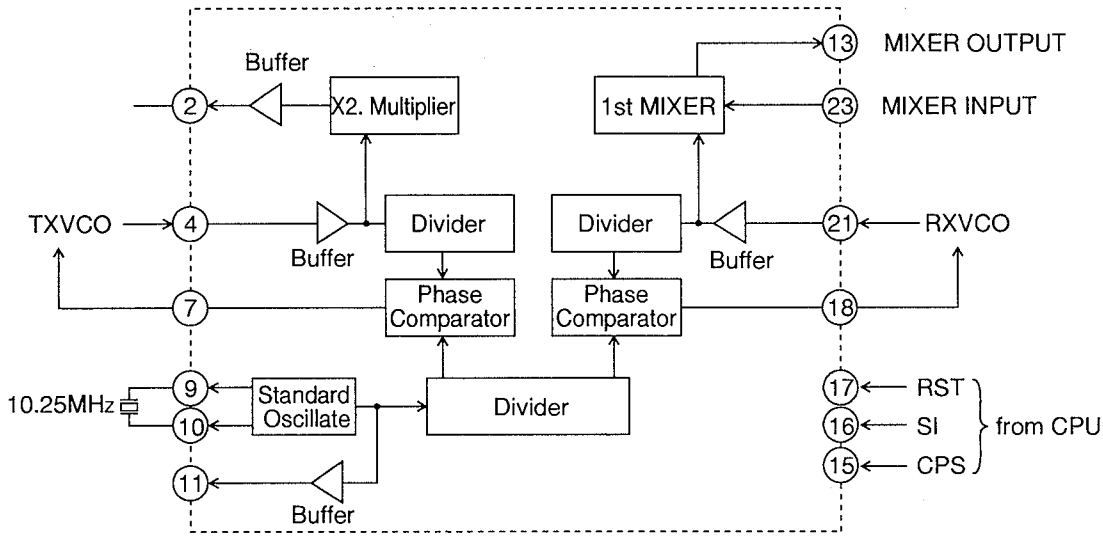
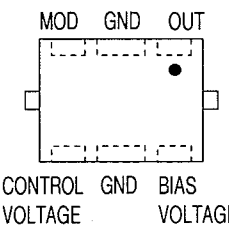
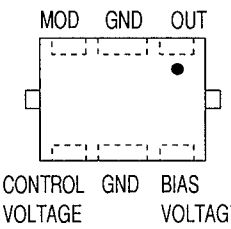


Fig. 46

■ TX VCO, RX VCO

TX VCO and RX VCO are module as shown below table.

	TX VCO	RX VCO
Pin Layout	 Shield Case side View	 Shield Case side View
Oscillator Frequency	Portable Handset 463.05~463.775MHZ Base Unit 451.05~451.775MHZ	Portable Handset 891.4~892.85MHZ Base Unit 936.8~938.25MHZ
Output Level	-6dB ±2dB	
Control Voltage	0.5~2.5VDC	

■ RECIEVER RF CIRCUIT ( ): Portable Handset

The electric wave received from the antenna ia attenuated by the SAW filter F302 (F402) except the received frequency band Then it is amplifier Q304 (Q404) and Q303 (Q403), and supplied to the IC301 (IC401) pin ㉓ (MIXER input).

Circuit Diagram

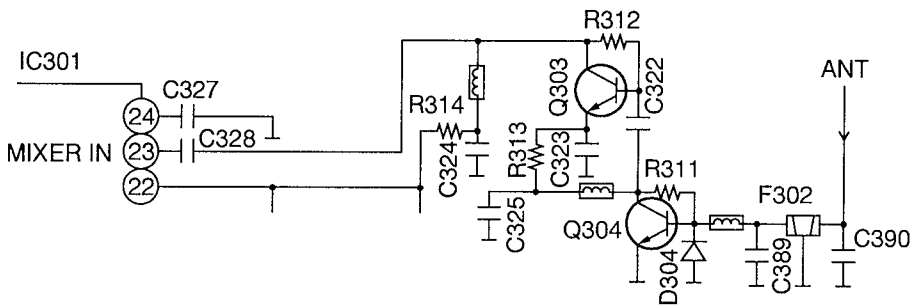


Fig. 47

■ MIXER IF CIRCUIT ( ): Portable Handset

The reception frequency band signal supplied to the pin ㉓ MIXER input of IC301 (IC401) is converted into a 10.7 MHz first IF signal by the mixer circuit, using the reception local signal. The result is then output to pin ⑬ MIXO. The resonator circuit consisting of L304, C336 (L404, C436) resonates at 10.7 MHz. The 10.7 MHz IF signal is filtered by ceramic filter F303 (F403) and then supplied to IF amplifier Q305 (Q405).

Circuit Diagram

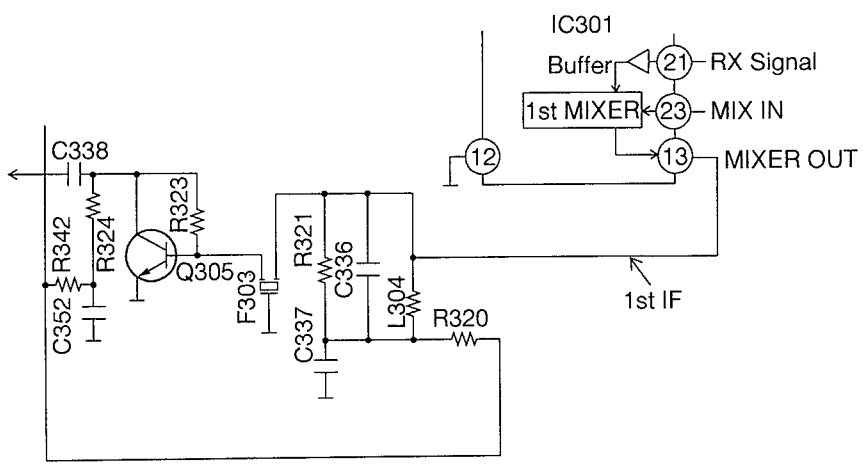


Fig. 48

■ TX POWER CIRCUIT ( ): Portable Handset

After being multiplied by 2 inside IC301 (IC401) to make it a 900 MHz band frequency, the transmission signal is amplified by Q301 and Q302 (Q401 and Q402) and frequency elements outside of the transmission frequency are attenuated by dielectric filter F301 (F401). The signal then passes through a transmission-reception matching circuit and supplied to the antenna terminal.

Circuit Diagram

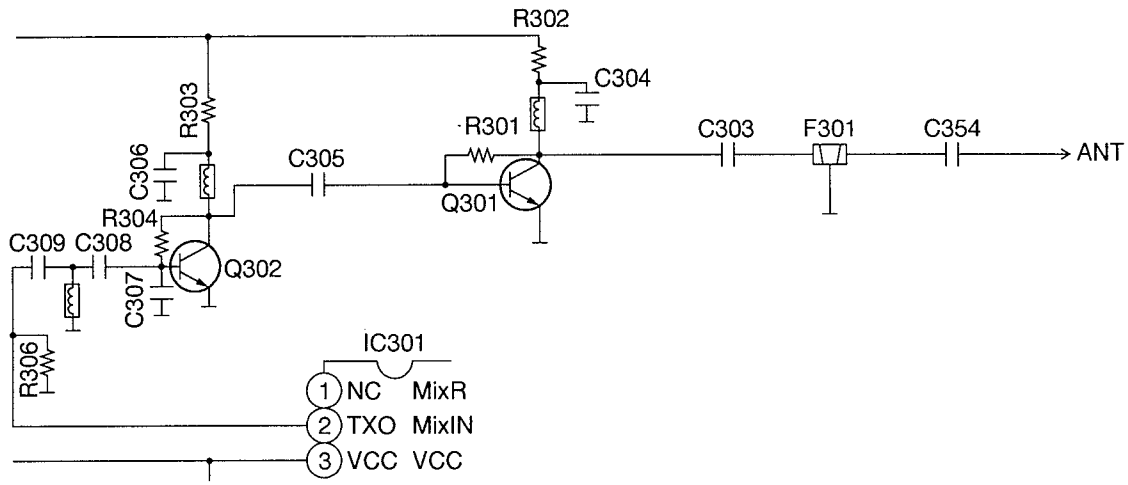
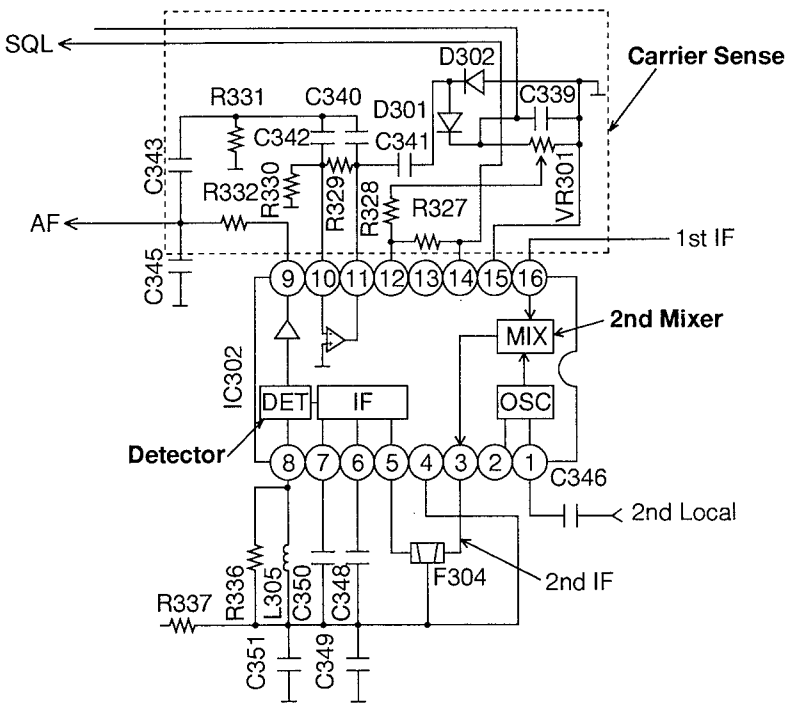


Fig. 49

■ SECOND MIXER, DETECTOR, CARRIER SENSE CIRCUIT ( ): Portable Handset

The 10.7 MHz IF signal from Q305 (Q405) passes through pin ⑯ of IC302 (IC402) and is input to the second mixer built into the IC. The reference oscillator frequency from IC301 (IC401) is used as the second local signal.
After being converted into a 450 kHz second IF by the second mixer, the signal is wave detected and output to pin ⑨ as a low-frequency signal. This signal is output as the AF output signal and, at the same time, used for electric field determination. The FM noise is filtered by a 10 kHz BPF comprising pins ⑩ and ⑪ and then amplified. Then it is rectified by D301 (D401) and D302 (D402), and input to the switching block consisting of pins ⑫ through ⑭ .

Circuit Diagram



	14 Pin
Enable to Electric Field	"L"
Disable to Electric Field	"H"

Fig. 50

BLOCK DIAGRAM (KX-TCM940R-B)

(Control Block)

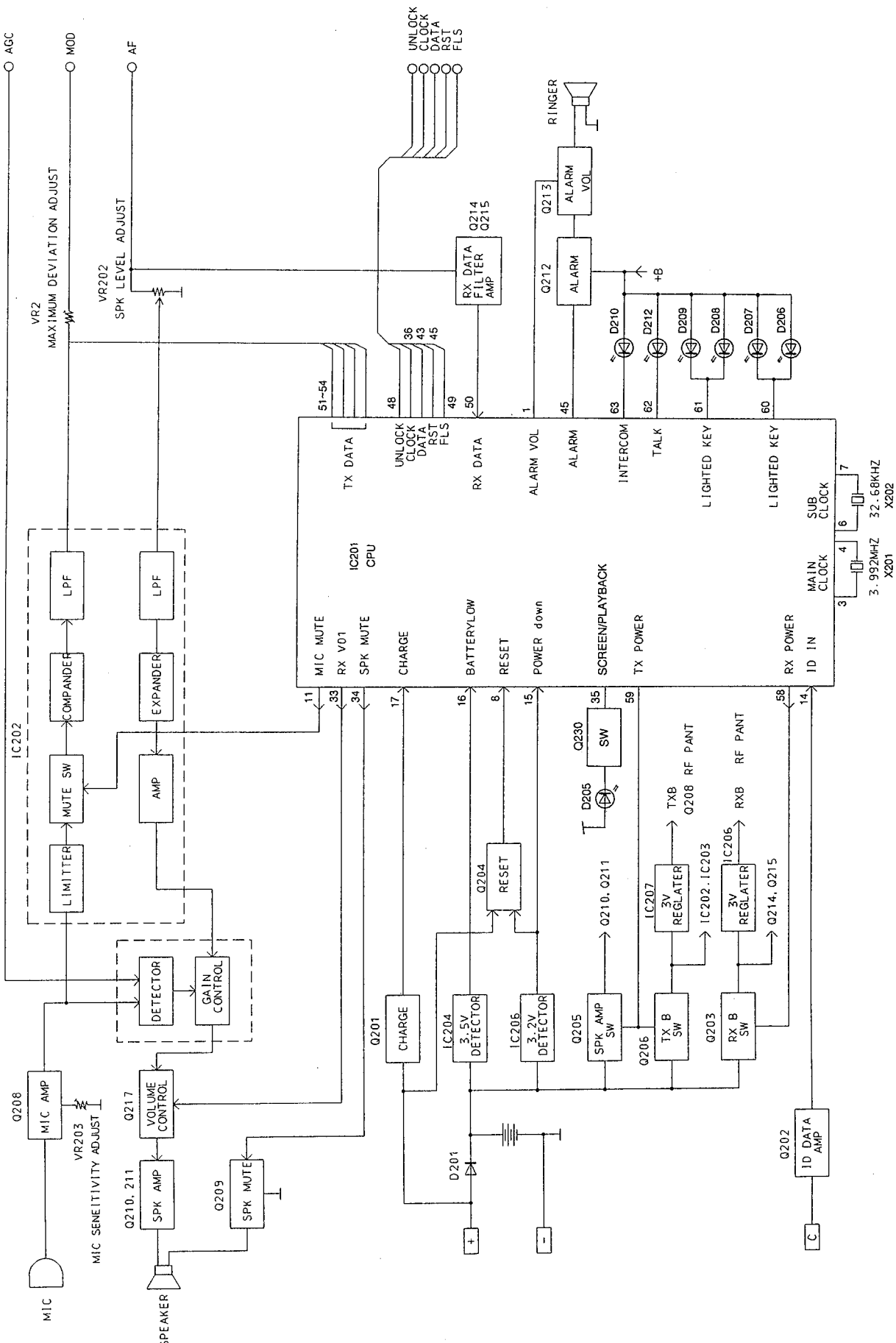


Fig. 51

(RF Block)

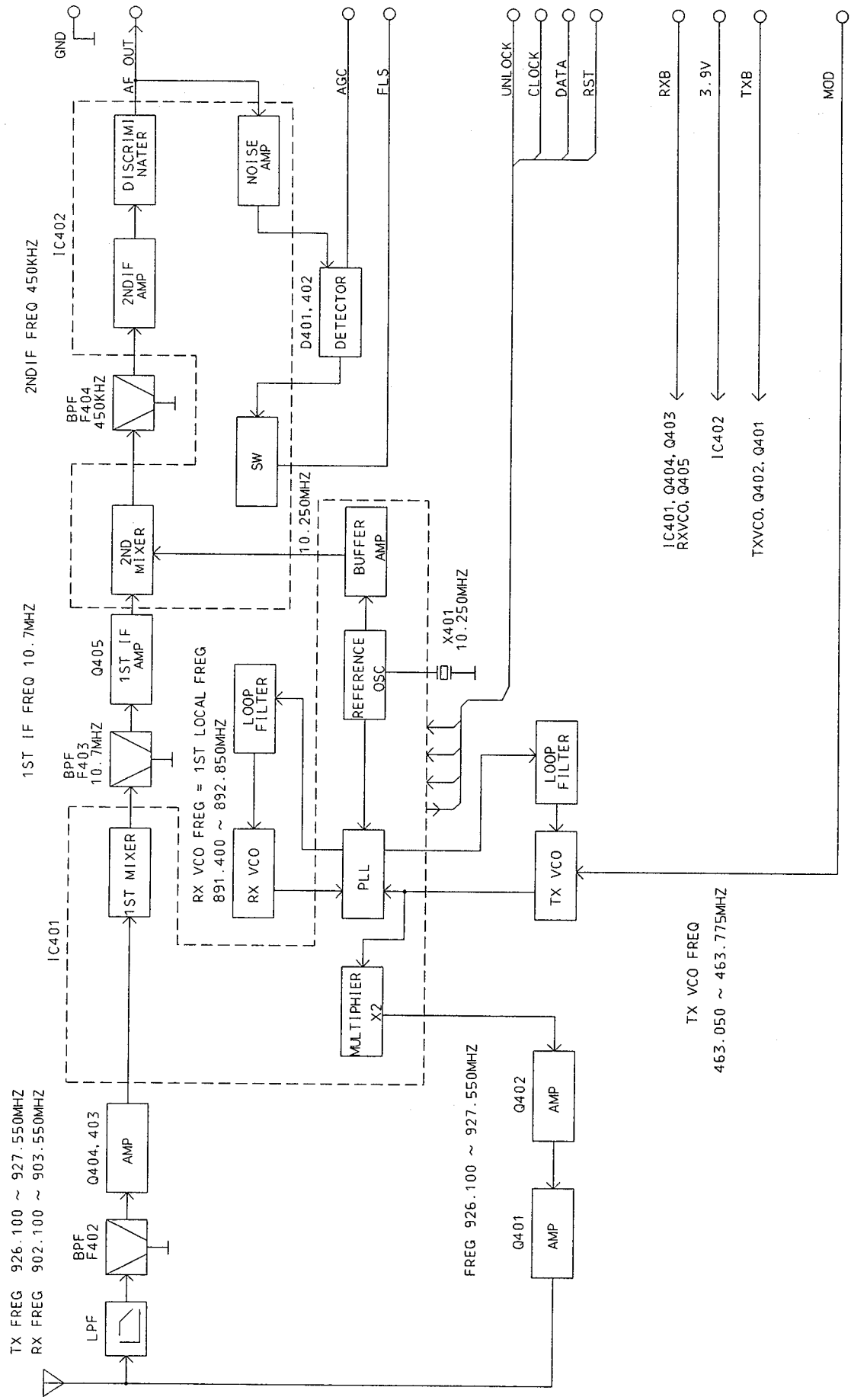


Fig. 52

NORMAL CIRCUIT OPERATION (KX-TCM940R-B)

■ POWER SUPPLY CIRCUIT

As indicated in Fig.40, voltage is supplied separately to each block. In order to ensure that the RF block in particular has a stable fixed-voltage power supply, the RF block is equipped with a dedicated stabilized power supply.
In the standby mode, pin ㊽ drops at set intervals from high to low level, resulting in an intermittent reception signal.
In the talk mode, pins ㊾ and ㊽ are low level and power is supplied to all the circuitry.

Circuit Diagram

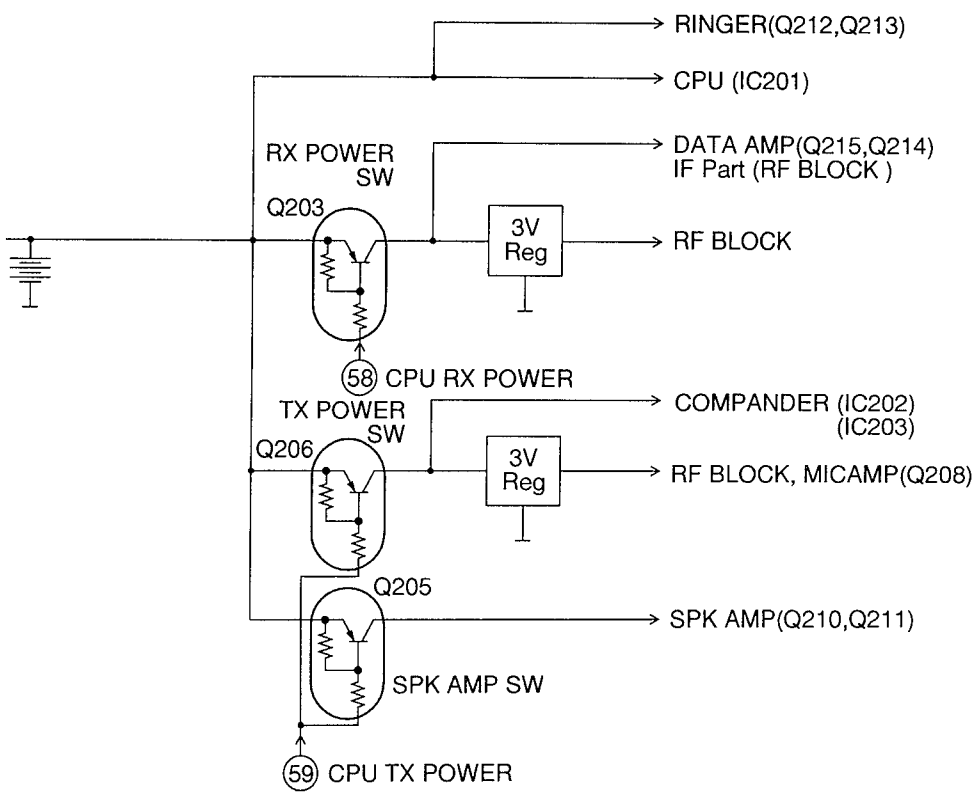


Fig. 53

■ DATA RECEPTION CIRCUIT

The wave detection signal from the RF block has high frequency elements eliminated by a CR filter consisting of R258 and C244. Then it is amplified by Q215 and, once again, high frequency elements are eliminated by R255 and C243. After this, the signal is amplified by Q214 and input to pin ㊿ of the CPU. (The cutoff frequency is 500 Hz.)
The data output waveform is a block pulse. To inhibit block pulse noise, the gain of the amplifier is limited and modulation is clipped at 3 kHz.

Circuit Diagram

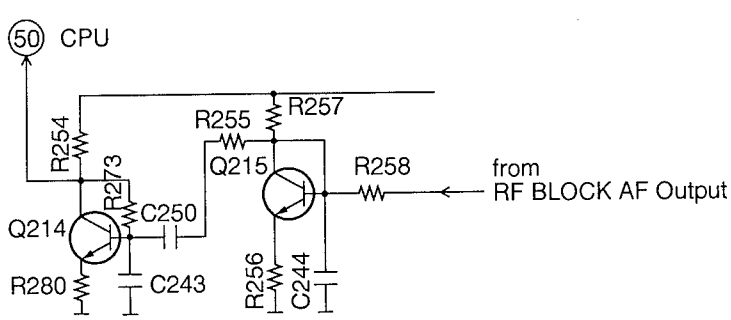


Fig. 54

■ RINGER CIRCUIT

If the ringer volume is set to low and the key is entered occurs, an alarm tone is output from pin ㊺ of the CPU and input to Q212. This causes Q213 to turn off and results in a softer beep tone.
If the ringer volume is set to high, Q213 turns on and results in a louder beep tone.

Circuit Diagram

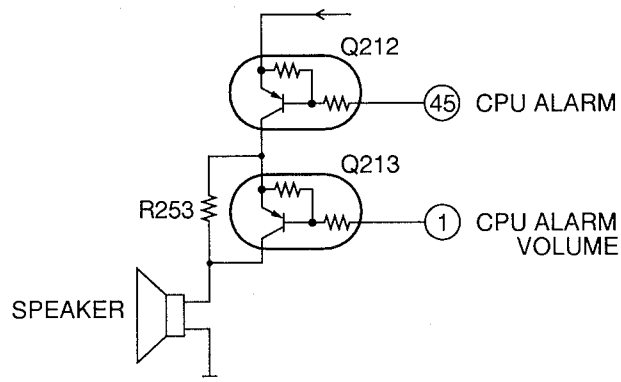


Fig. 55

■ RECEPTION SIGNAL CIRCUIT

The receiver circuit comprises expander IC202, side tone control IC IC208, and a speaker amplifier.
After being adjusted to the appropriate level by VR202, the signal passes through a 3 kHz LPF and an expander built into IC202. It is then input to side tone IC IC208. The side tone IC is connected to the microphone amplifier. If a large input is input to the microphone, the gain control built into IC208 lowers the gain to reduce the output of the speaker amplifier. If there is no large input being input to the microphone, the amplifier in IC208 is set to standard gain. Consequently, the sound of the received audio signal becomes fainter when the user is talking in a loud voice and the side tone level is lowered. When the user talks more softly, the received audio signal is audible at the standard level.
Also, in addition to the input from the microphone, the ACG signal from the RF block is input to the side tone IC. When the base unit and portable handset are separated from each other, causing the signal to become weaker, the DC voltage rises and this voltage is input to pin ⑤ of IC208. When the DC voltage input to pin ⑤ rises, the gain control built into IC208 lowers the gain. Consequently, the reception level is lowered when the reception signal is weak and there is more noise. This prevents the noise from becoming too noticeable.
The reception signal passes through receiver volume selector switch Q217, and then drives the receiver speaker.

RX VOL	H	: LOW LEVEL
	L	: HIGH LEVEL
SPK MUTE	H	: SPEAKER ON
	L	: SPEAKER OFF

Circuit Diagram

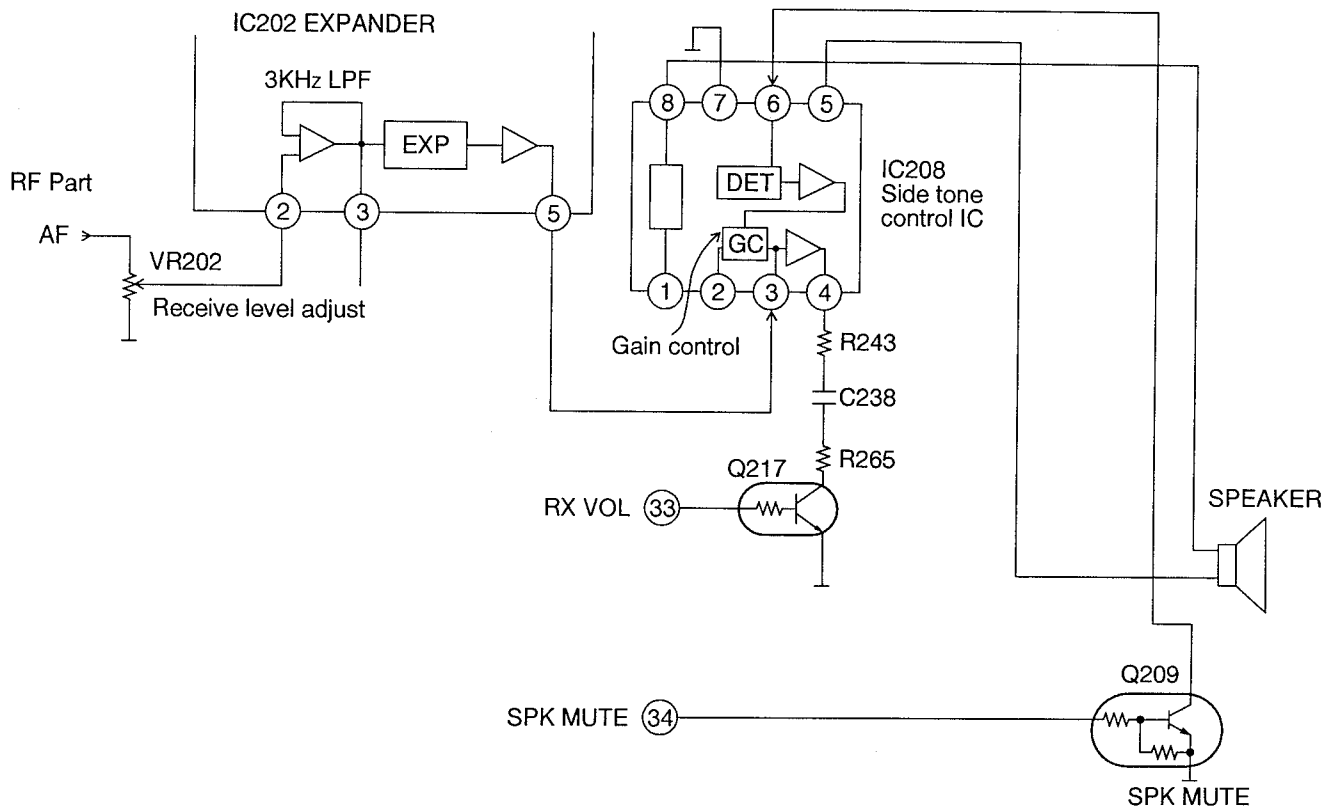


Fig. 56

■ SENDING SIGNAL CIRCUIT

The audio signal from the microphone is amplified by Q208 and then passes through a limiter, mute circuit, compander, and 3 kHz LPF built into IC202. It is then mixed with the TX DATA signal from the CPU, the maximum modulation is adjusted by VR201, and input to the modulator in the RF block.

Circuit Diagram

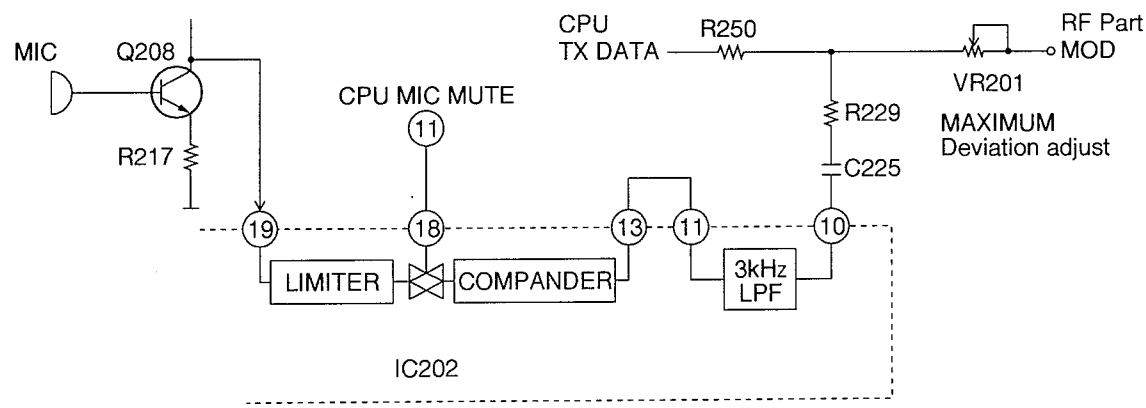


Fig. 57

■ RESET/POWER DOWN/BATTERY LOW/ID

When the battery is installed in the portable handset, the reset circuit consisting of R289, C255, and Q204 functions, inputting a reset signal to the CPU. This ensures that the unit will operate normally without the user's needing to switch the power off and on.
When the voltage from the batteries drops to 3.5 V, 3.5 V voltage detector IC204 operates and inputs a battery low signal to the CPU. This causes the battery low LED to flash on and off. If voltage continues to drop and reaches 3.2 V, 3.2 V voltage detector IC206 operates and outputs a power down signal to the CPU. This causes power to be cut off automatically and prevents the battery from over discharging.
Q201 is a charge detector that informs the CPU whether or not the portable handset is currently being charged. During charging, ID data is sent from the base unit. Q202 receives this ID data and sends it to the CPU.

Circuit Diagram

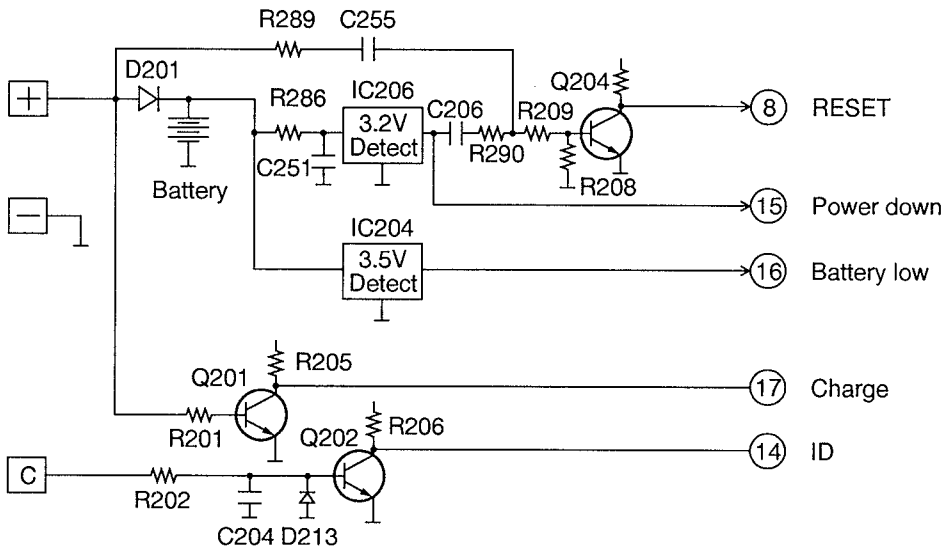
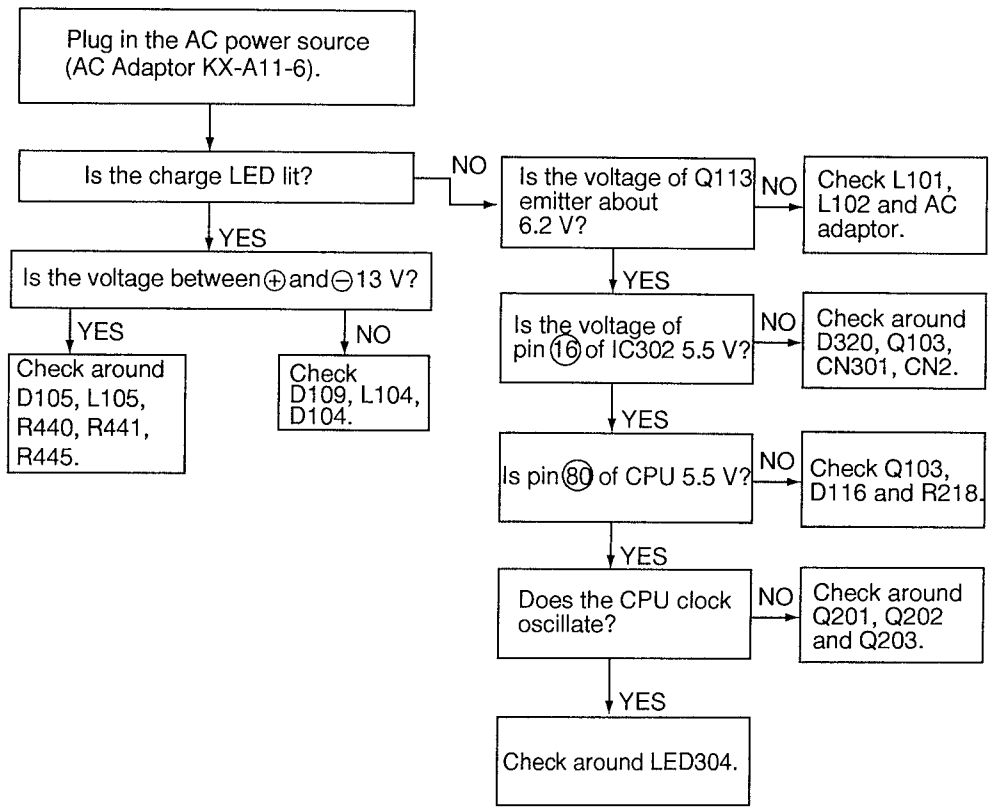


Fig. 58

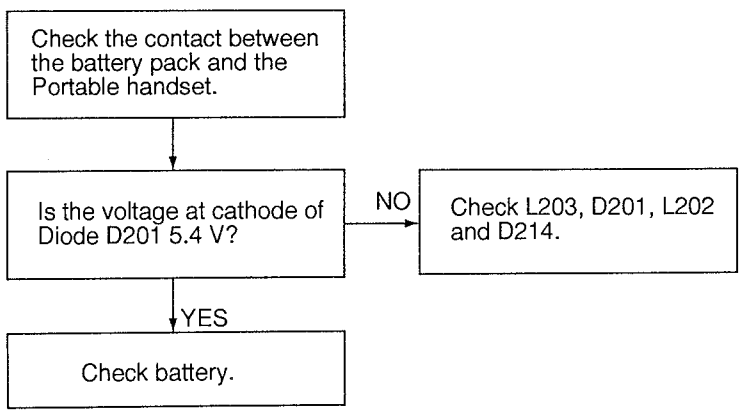
TROUBLESHOOTING GUIDE

(CORDLESS SECTION)

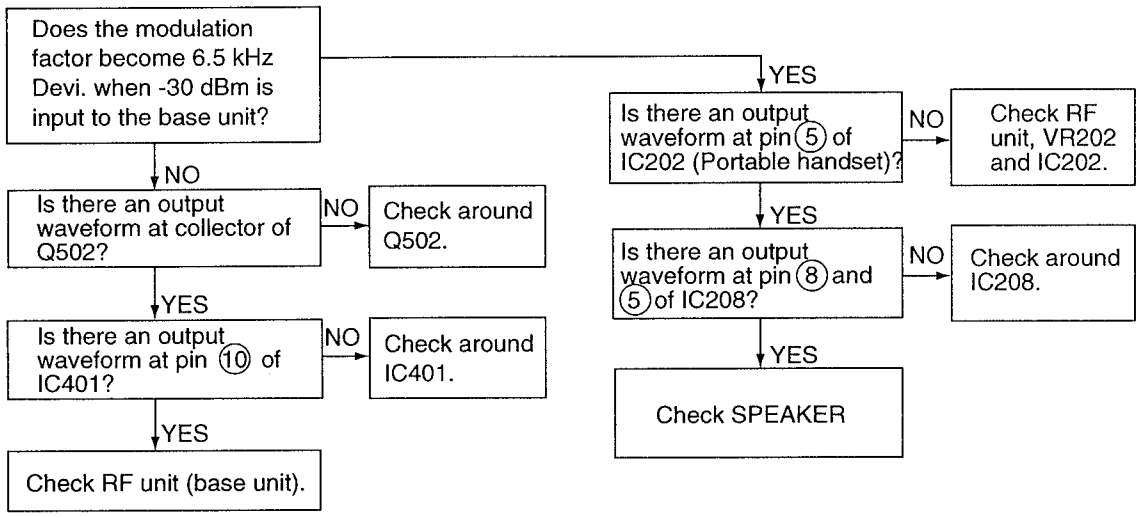
1. Battery won't charge (Base unit)



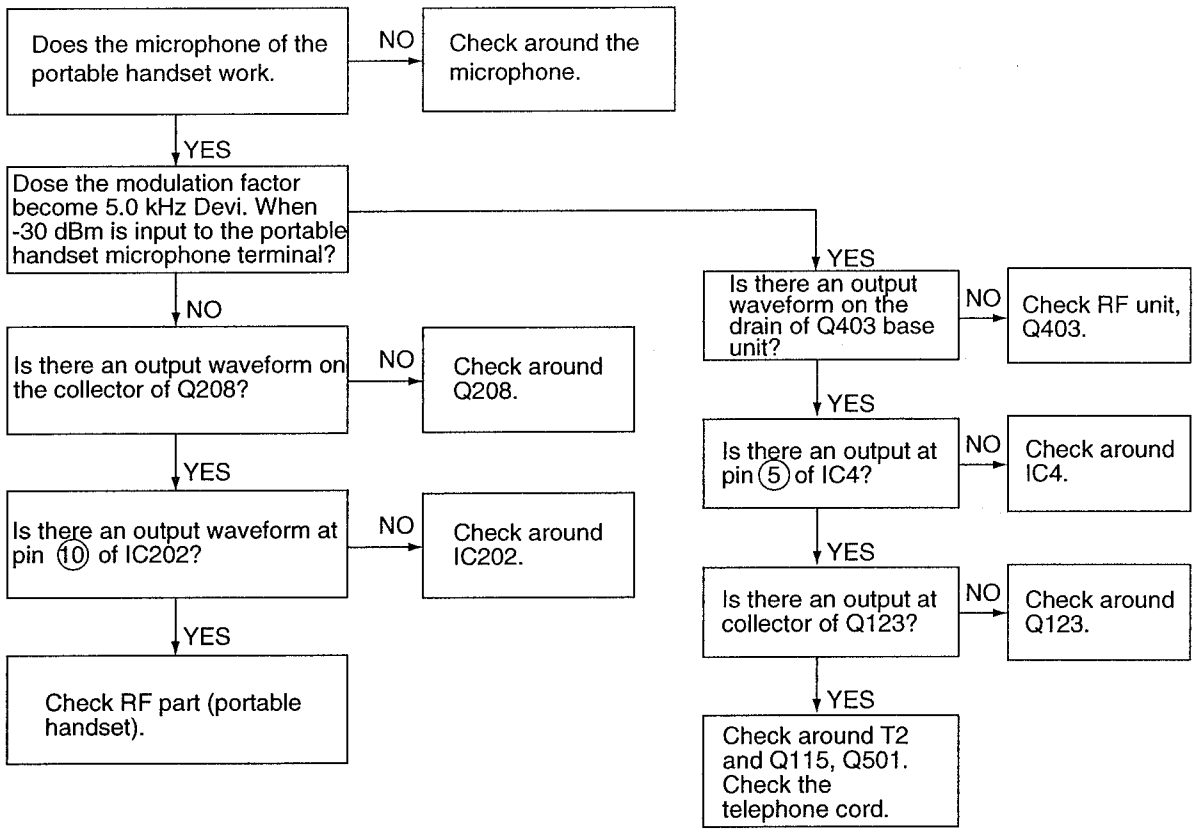
2. Battery won't charge (Portable handset)



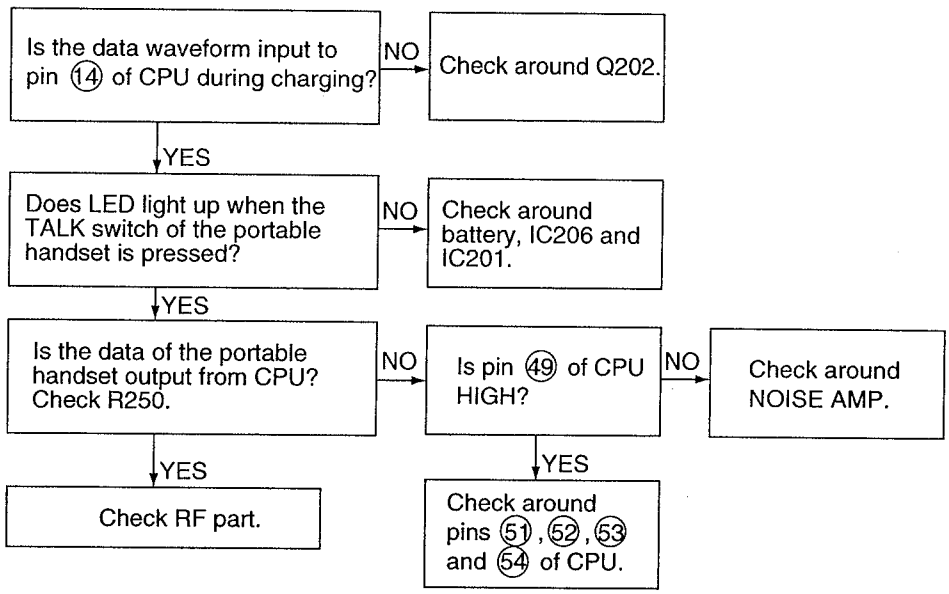
3. No voice reception



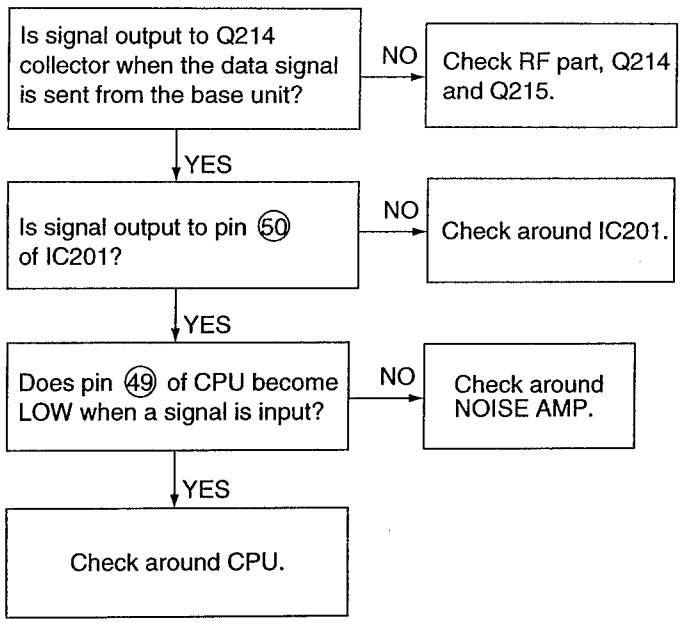
4. No voice transmission



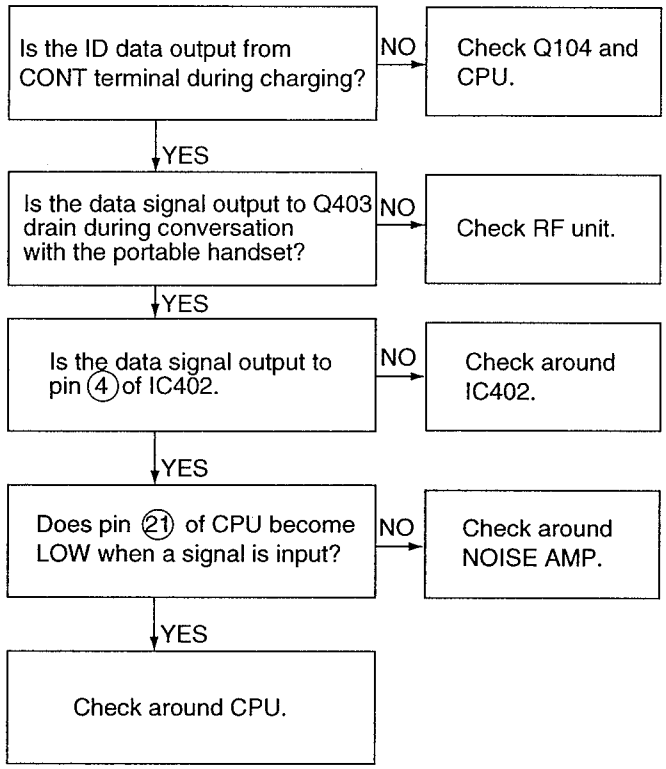
5. No link (Portable handset TX)



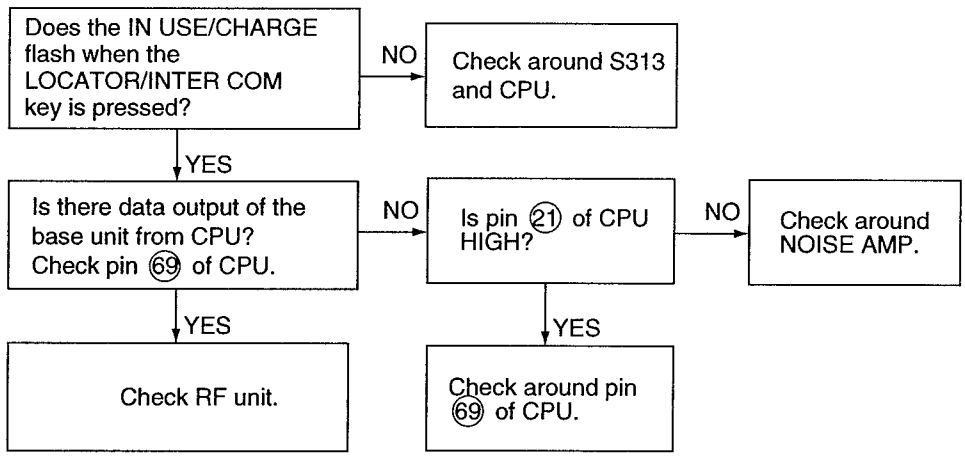
6. No link (Portable handset RX)



7. No link (Base unit RX)

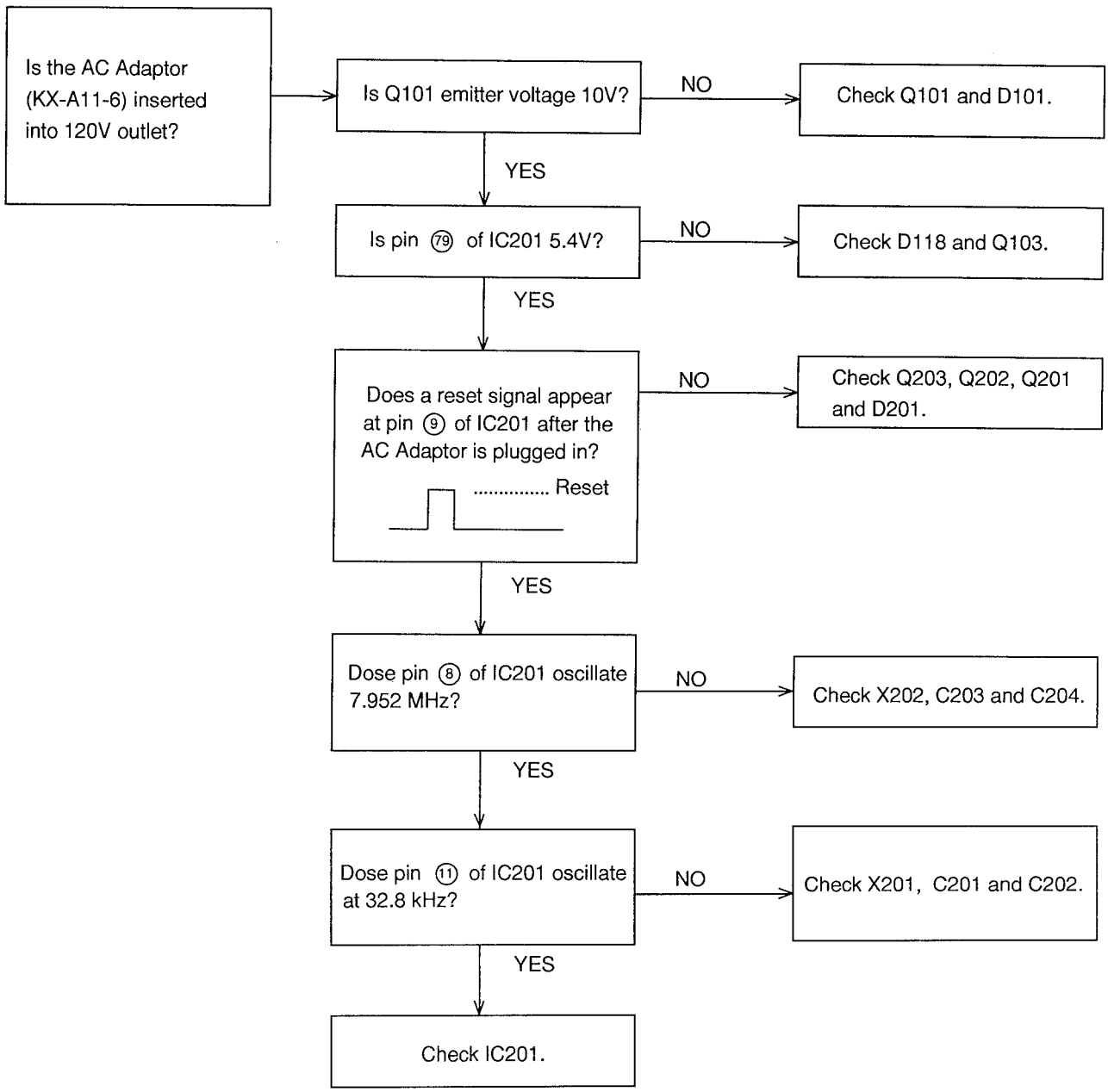


8. No link (Base unit TX)

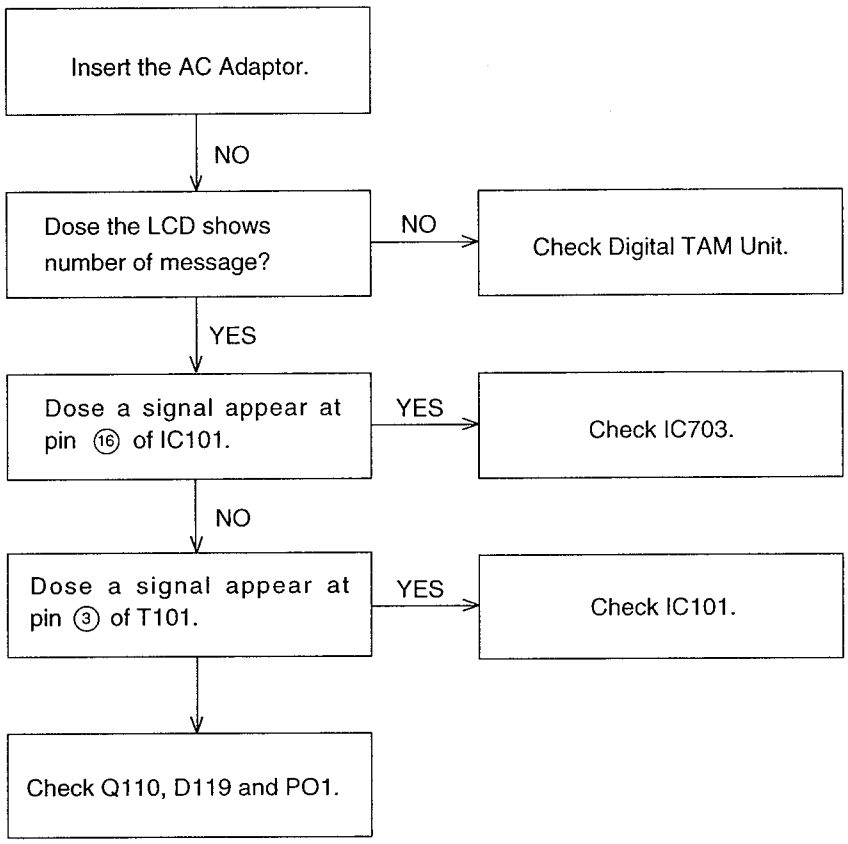


(TAM SECTION)

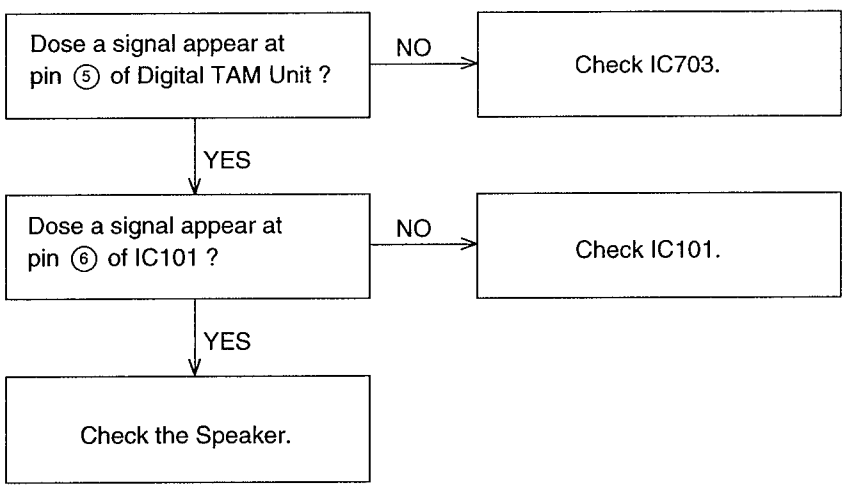
1. FUNCTIONS DO NOT OPERATE



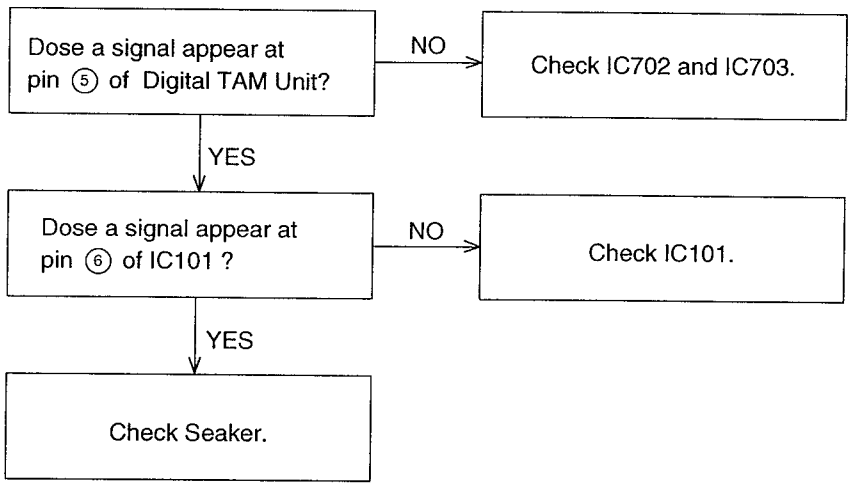
2. DOES NOT RECORD



3. DOES NOT PLAYBACK



4. CANNOT FIND THE SYNTHESIZED VOICE



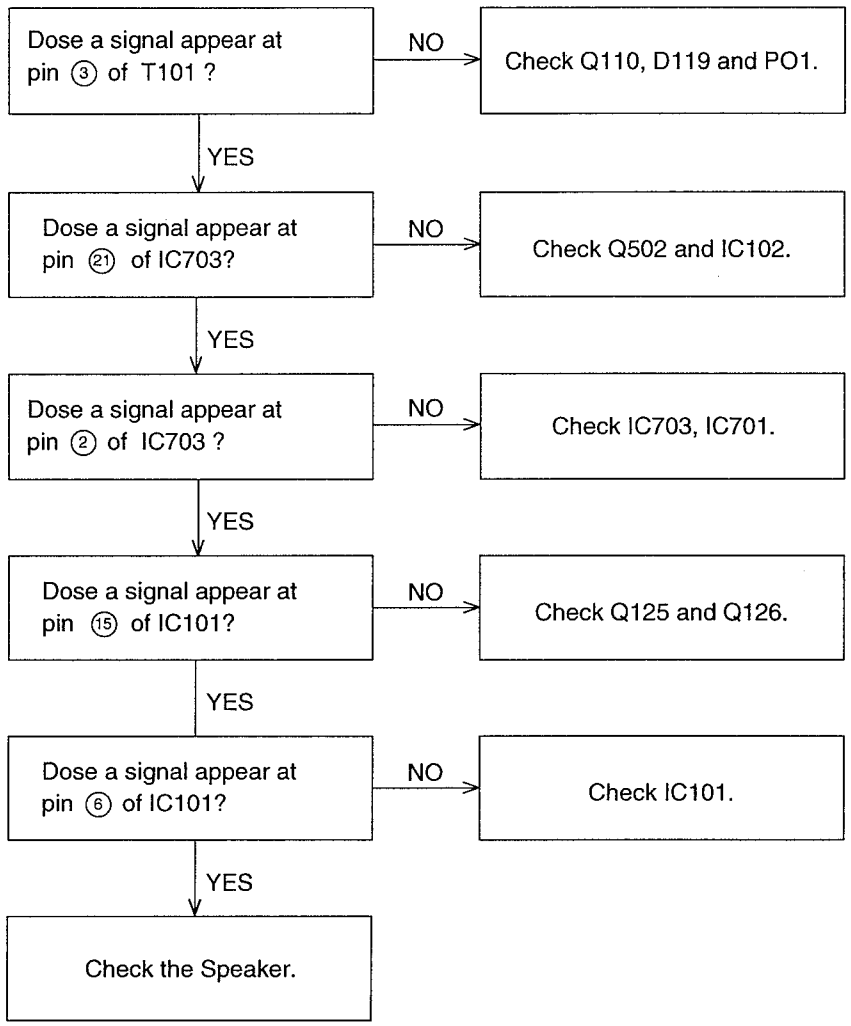
5. END OF MESSAGE IS CLIPPED WHEN CALLER HANGS UP

When caller hangs up, the KX-TCM940-B can detect the following 4 signal type.

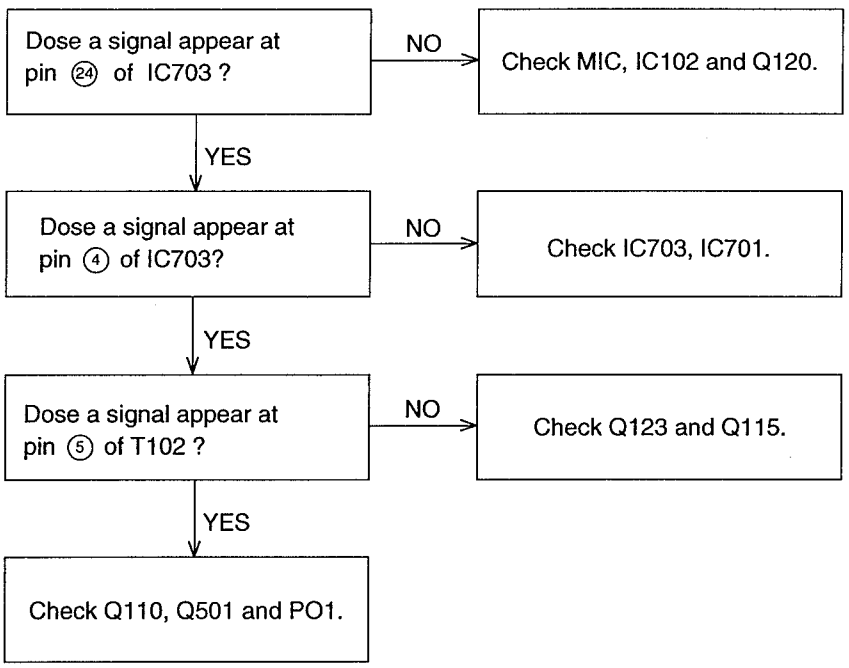
A. CPC pulse.
B. Dial tone or other continuous tones.
C. Silence.
D. Cycle signals.

A. Check CPC DETECTOR CIRCUIT (D117, R170, R160, R161 and PC102)
B.,C.,D
Check VOX DETECTOR CIRCUIT (IC101, R137, R138, C131 and C130)

6. WHEN SP-PHONE WORKS, DOES NOT RECEIVE

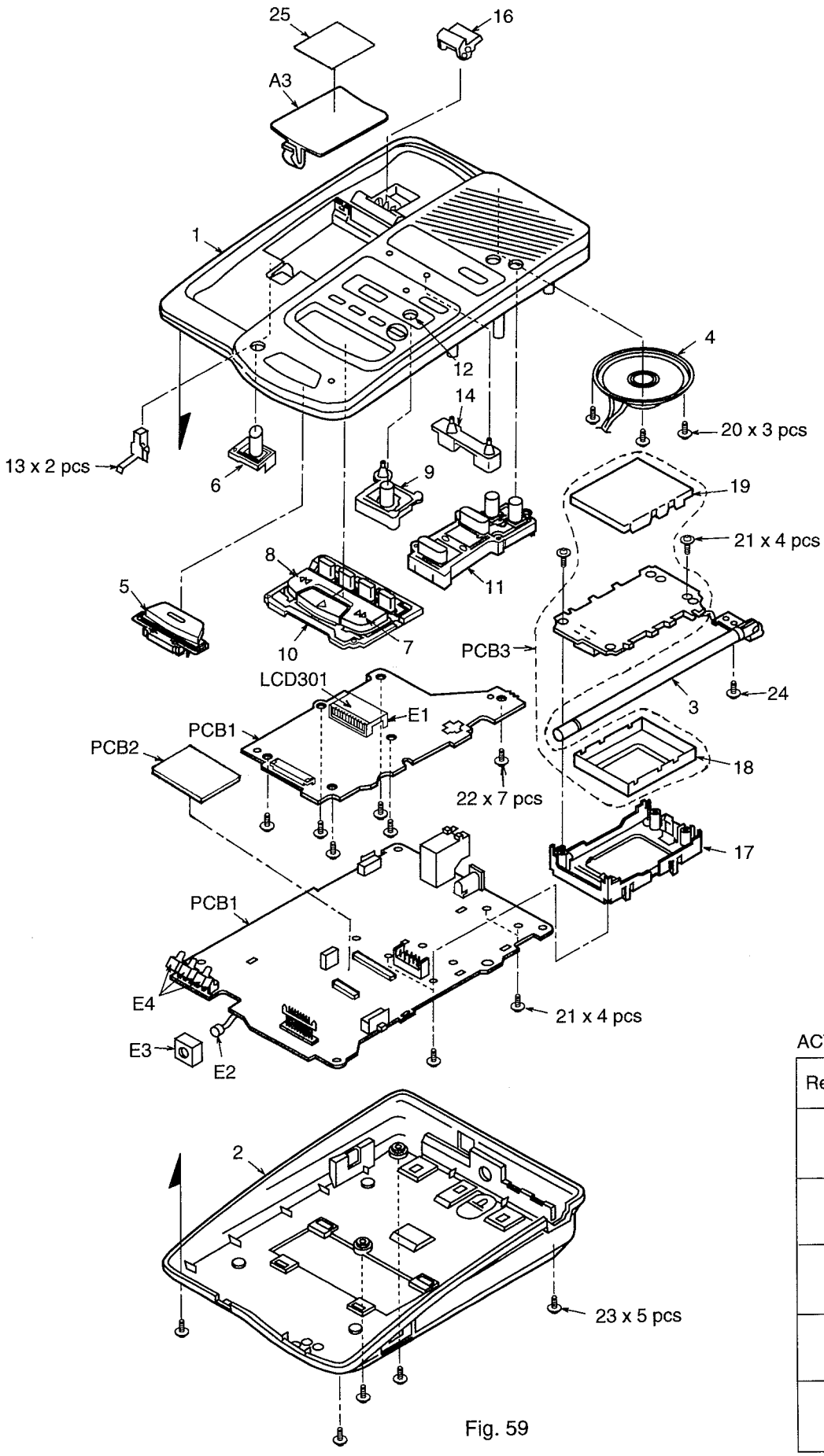


7. WHEN SP-PHONE WORKS, DOES NOT TRANSMIT



KX-TCM940-B

CABINET AND ELECTRICAL PARTS LOCATION (KX-TCM940H-B)



ACTUAL SIZE OF SCREWS

Ref.No.	Figure
20	
21	
22	
23	
24	

Fig. 59

CABINET AND ELECTRICAL PARTS LOCATION (KX-TCM940R-B)

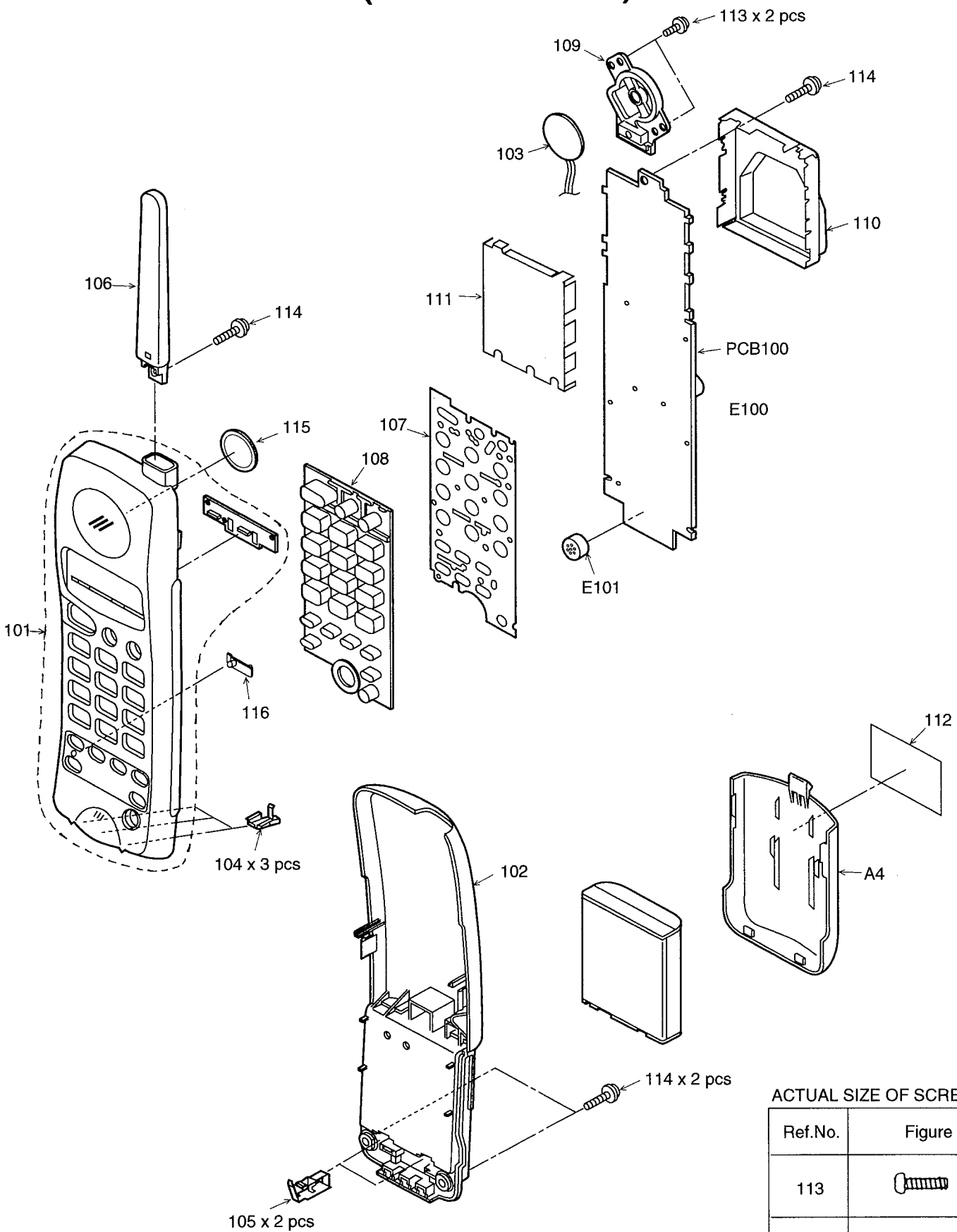


Fig. 60

ACTUAL SIZE OF SCREWS

Ref.No.	Figure
113	
114	

ACCESSORIES AND PACKING MATERIALS

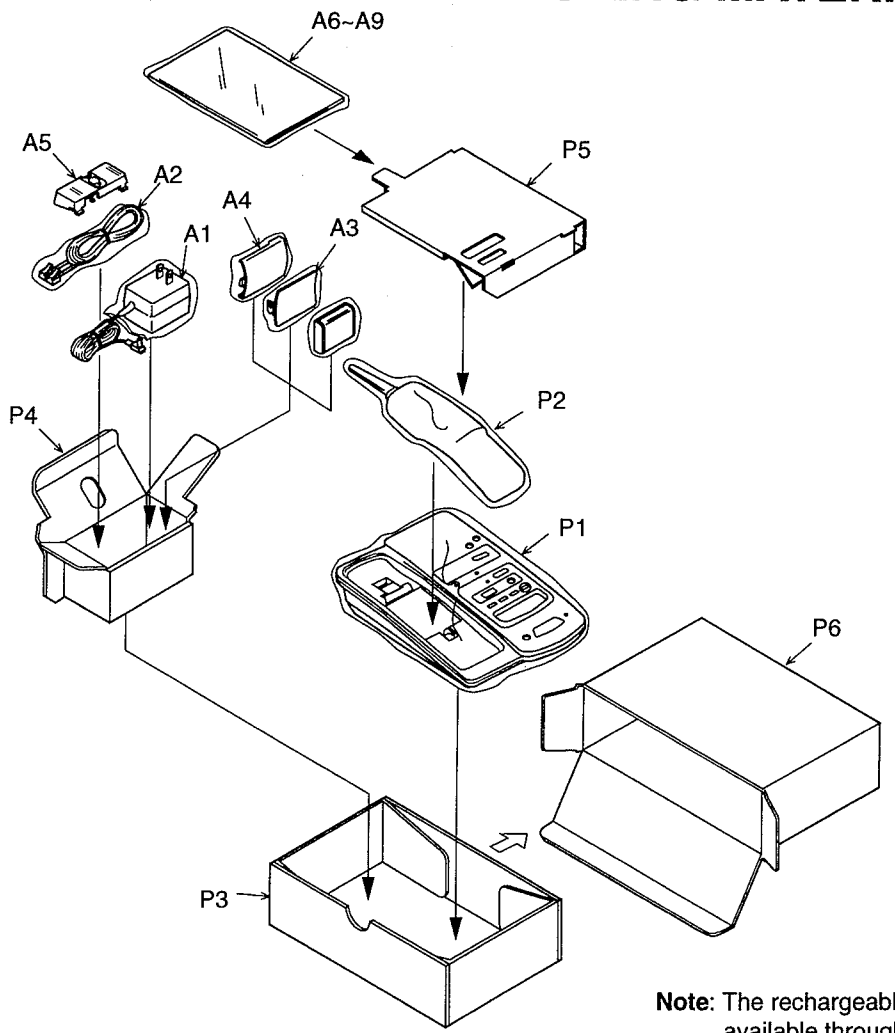


Fig. 61

Note: The rechargeable Ni-Cd battery KX-A92 are available through sales route of Panasonic.

FIXTURES AND TOOLS

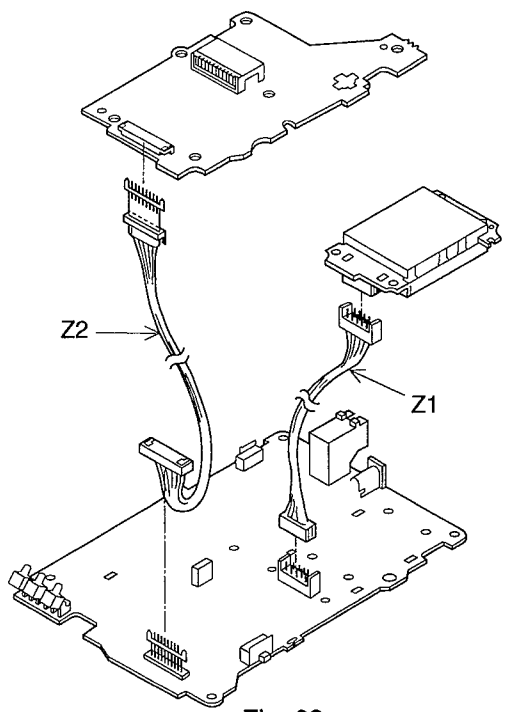


Fig. 62

This replacement parts list is U.S.A. version only. Refer to the simplified manual (cover) for other areas.

REPLACEMENT PARTS LIST

Model KX-TCM940H-B

Note:

1. RTL (Retention Time Limited)
   The marking (RTL) indicates that the Retention Time is limited for this item. After the discontinuation of this assembly in production, the item will continue to be available for a specific period of time. The retention period of availability is dependent on the type of assembly, and in accordance with the laws governing part and product retention.
   After the end of this period, the assembly will no longer be available.
2. Important safety notice.
   Components identified by a ⚠ mark special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.
3. The S mark indicates service standard parts and may differ from production parts.
4. RESISTORS & CAPACITORS
   Unless otherwise specified.
   All resistors are in ohms (Ω) K=1000Ω, M=1000KΩ
   All capacitors are in MICRO FARADS (μF) P= μμF
   *Type &Wattage of Resistor
   Type

ERC:Solid	ERX:Metal Film	PQ4R:Carbon
ERD:Carbon	ERG:Metal Oxide	ERS:Fusible Resistor
PQRD:Carbon	ER0:Metal Film	ERF:Cement Resistor

Wattage

10,16:1/8W	14,25:1/4W	12:1/2W	1:1W	2:2W	3:3W

*Type & Voltage of Capacitor
Type

ECFD:Semi-Conductor	ECCD,ECKD,ECBT,PQCBC : Ceramic
ECQS:Styrol	ECQE,ECQV,ECQG : Polyester
PQCUV:Chip	ECEA,ECSZ : Electrolytic
ECQMS:Mica	ECQP : Polypropylene

Voltage

ECQ Type	ECQG ECQV Type	ECSZ Type	Others	
1H: 50V	05: 50V	0F:3.15V	0J :6.3V	1V :35V
2A:100V	1:100V	1A:10V	1A :10V	50,1H:50V
2E:250V	2:200V	1V:35V	1C :16V	1J :63V
2H:500V		0J:6.3V	1E,25:25V	2A :100V

Ref. No.	Part No.	Part Name & Description	Pcs/Set
		CABINET & ELECTRICAL PARTS	
1	PQKM10256Z1	UPPER CABINET	1
2	PQYF10101V1	LOWER CABINET	1
3	PQSA10047Z	ANTENNA	1
4	PQAS57P02Y	SPEAKER	1
5	PQBC10223Z1	BUTTON	1
6	PQBC10224Z1	BUTTON	1
7	PQBC10225Z1	BUTTON	1
8	PQBC10226Z1	BUTTON	1
9	PQBC10227Z1	BUTTON	1
10	PQBX10268Z1	BUTTON	1
11	PQBX10269Z1	BUTTON	1
12	PQGP10128Z1	PANEL	1
13	PQJT10086Z	CHARGE TERMINAL	2
14	PQHR10509Z	LED SPACER	1
15	PQHR10510Z	LED SPACER	1
16	PQKE10055Z1	HANGER	1
17	PQHR10484Z	RF UNIT HOLDER	1
18	PQMC10214Z	SHIELD COVER	1
19	PQMC10215Z	SHIELD COVER	1
20	PJHE5065Z	SCREW	3
21	XTW26+7P	SCREW	8
22	XTW3+S10P	SCREW	7
23	XTW3+S14P	SCREW	5
24	XYC3+CG10FX	SCREW	1
25	PQQT11232Z	LABEL	1

Ref. No.	Part No.	Part Name & Description	Pcs/Set
		MAIN P.C.BOARD PARTS	
PCB1	PQWPTCM940BH	P.C.BOARD ASS'Y (RTL)	1
		(ICS)	
IC101	PQVISC111815	IC	1
IC102	PQVINJM4558M	IC	1
IC201	PQVI4639RA50	IC	1
IC202	PQVI93LC46XI	IC	1
IC301	PQVIMC4094BF	IC	1
IC302	PQVIMC4094BF	IC	1
IC401	AN6165SB	IC	1
IC402	PQVITC4069UBF	IC	1
		(TRANSISTORS)	
Q4	2SD601R	TRANSISTOR(SI)	1
Q100	2SD1994A	TRANSISTOR(SI)	1
Q101	2SD2136	TRANSISTOR(SI)	1
Q102	2SD1994A	TRANSISTOR(SI)	1
Q103	2SD1994A	TRANSISTOR(SI)	1
Q104	2SD1991A	TRANSISTOR(SI)	1
Q110	2SA1625	TRANSISTOR(SI) ⚠	1
Q111	2SD601R	TRANSISTOR(SI) ⚠	1
Q112	2SD601R	TRANSISTOR(SI)	1
Q113	2SD1994A	TRANSISTOR(SI)	1
Q115	2SD601R	TRANSISTOR(SI)	1
Q116	2SB709A	TRANSISTOR(SI)	1
Q118	2SD601R	TRANSISTOR(SI)	1
Q119	2SD601R	TRANSISTOR(SI)	1
Q120	2SD601R	TRANSISTOR(SI)	1
Q121	2SD601R	TRANSISTOR(SI)	1
Q122	2SD601R	TRANSISTOR(SI)	1
Q123	2SD1819A	TRANSISTOR(SI)	1
Q125	2SB709A	TRANSISTOR(SI)	1
Q126	2SD601R	TRANSISTOR(SI)	1
Q201	2SB709A	TRANSISTOR(SI)	1
Q202	2SD601R	TRANSISTOR(SI)	1
Q203	2SB709A	TRANSISTOR(SI)	1
Q301	2SD601R	TRANSISTOR(SI)	1
Q302	2SD601R	TRANSISTOR(SI)	1
Q303	2SD601R	TRANSISTOR(SI)	1
Q304	2SD601R	TRANSISTOR(SI)	1
Q305	2SD601R	TRANSISTOR(SI)	1
Q401	2SD601R	TRANSISTOR(SI)	1
Q403	2SK543	TRANSISTOR(SI)	1
Q404	2SD601R	TRANSISTOR(SI)	1
Q408	2SD1991A	TRANSISTOR(SI)	1
Q410	2SD601R	TRANSISTOR(SI)	1
Q501	2SC2120	TRANSISTOR(SI) ⚠	1
Q502	2SD1819A	TRANSISTOR(SI)	1
Q503	2SD601R	TRANSISTOR(SI)	1
		(DIODES)	
D101	MA4100	DIODE(SI)	1
D103	MA4150	DIODE(SI)	1
D104	MA4150	DIODE(SI)	1
D105	MA4150	DIODE(SI)	1
D106	MA8150	DIODE(SI)	1
D107	MA8150	DIODE(SI)	1
D109	PQVDS5688G	DIODE(SI)	1
D110	1SS119	DIODE(SI)	1
D116	1SS119	DIODE(SI)	1
D117	PQVDMTZ3R6	DIODE(SI) ⚠	1
D118	MA4068	DIODE(SI)	1
D119	PQVDS1ZB40F1	DIODE(SI) ⚠	1
D120	1SS119	DIODE(SI)	1
D122	MA4180	DIODE(SI) ⚠	1
D130	1S2076	DIODE(SI)	1

KX-TCM940-B

This replacement parts list is U.S.A. version only. Refer to the simplified manual (cover) for other areas.

Ref. No.	Part No.	Part Name & Description	Pcs/Set
D201	MA4047	DIODE(SI)	1
D301	1SS119	DIODE(SI)	1
D302	1SS119	DIODE(SI)	1
D303	1SS119	DIODE(SI)	1
D320	1SS119	DIODE(SI)	1
D401	PQVDS5688G	DIODE(SI)	1
D402	1S2076	DIODE(SI)	1
D403	MA110	DIODE(SI)	1
D408	MA110	DIODE(SI)	1
D411	1SS119	DIODE(SI)	1
DH	1SS119	DIODE(SI)	1
LED301	LNJ801LPDJA	LED	1
LED302	LN88RCPHTAMP	LED	1
LED303	LNJ801LPDJA	LED	1
LED304	LNJ301MPUJA	LED	1
LED305	LNJ801LPDJA	LED	1
		(COILS AND TRANSFORMERS)	
L101	PQLQXF1R5K	COIL S	1
L102	PQLQXF1R5K	COIL S	1
L103	PQLQZM2R2K	COIL	1
L104	PQLQZM2R2K	COIL	1
L105	PQLQZM2R2K	COIL	1
L106	PQLQZM330K	COIL	1
L402	PQLQZM2R2K	COIL	1
T101	PQLT8F5A	TRANSFORMER ⚠	1
T102	PQLT8F3A	TRANSFORMER ⚠	1
		(SWITCHES)	
S1	PQSS3A17W	SWITCH	1
S2	PQSS2A27W	SWITCH	1
S3	EVQQJJ05Q	SWITCH	1
S4	EVQQJJ05Q	SWITCH	1
S302	EVQQJJ05Q	SWITCH	1
S305	EVQQJJ05Q	SWITCH	1
S306	EVQQJJ05Q	SWITCH	1
S307	EVQQJJ05Q	SWITCH	1
S308	EVQQJJ05Q	SWITCH	1
S309	EVQQJJ05Q	SWITCH	1
S310	EVQQJJ05Q	SWITCH	1
S311	EVQQJJ05Q	SWITCH	1
S313	EVQQJJ05Q	SWITCH	1
S314	EVQQJJ05Q	SWITCH	1
S315	EVQQJJ05Q	SWITCH	1
S316	EVQQJJ05Q	SWITCH	1
		(VARIABLE RESISTORS)	
VR401	EVNDXAA03B24	VARIABLE RESISTOR	1
VR403	EVNDXAA03B54	VARIABLE RESISTOR	1
		(CRYSTAL OSCILLATORS)	
X201	PQVCL3276N6Z	CRYSTAL OSCILLATOR	1
X202	PQVCJ7952N5Z	CRYSTAL OSCILLATOR	1
		(JACKS)	
JJ1	PQJJ1B4Y	JACK, DC IN	1
JJ2	PQJJ1TA9Z	JACK, TEL	1
		(CONNECTORS)	
CN1	PQJP12B44Z	CONNECTOR	1
CN2	PQJP14B48Z	CONNECTOR	1
CN3	PQJP14A92Z	CONNECTOR	1
CN4	PQJP11A92Z	CONNECTOR	1
CN301	PQJS14A36Z	CONNECTOR	1

Ref. No.	Part No.	Part Name & Description	Pcs/Set
		(PHOTO COUPLERS)	
PC101	PQVITLP627	PHOTO ELECTRIC TRANSDUCER ⚠	1
PC102	PQVIPC817CD	PHOTO ELECTRIC TRANSDUCER ⚠	1
PC103	PQVIPC814K	PHOTO ELECTRIC TRANSDUCER ⚠	1
PC104	PQVIPC817CD	PHOTO ELECTRIC TRANSDUCER ⚠	1
		(OTHERS)	
SA101	PQVDDSS301L	VARISTOR ⚠	1
SA102	PQVDDSA242MU	VARISTOR ⚠	1
PO1	PQRPAR390N	POSISTOR ⚠	1
LCD301	PQADRCD1363R	LIQUID CRYSTAL DISPLAY	1
E1	PQHR10439Z	LCD HOLDER	1
E4	PQJM122Z	MICROPHONE	1
E3	PQMG10014Z	MIC COVER	1
E5	PQJT10119Z	CHARGE TERMINAL	3
		(RESISTORS)	
R31	ERJ3GEYJ473	47K	1
R57	ERJ3GEYJ565	5.6M	1
R58	ERJ3GEYJ223	22K	1
R61	ERJ3GEYJ223	22K	1
R62	ERJ3GEYJ333	33K	1
R80	ERJ3GEYJ564	560K	1
R81	ERJ3GEYJ333	33K	1
R82	ERJ3GEYJ333	33K	1
R90	ERJ3GEYJ154	150K	1
R91	ERJ3GEYJ105	1M	1
R92	ERJ3GEYJ155	1.5M	1
R93	ERJ3GEYJ333	33K	1
R94	ERJ3GEYJ154	150K	1
R101	ERDS2TJ221	220	1
R103	ERDS2TJ332	3.3K	1
R105	PQ4R10XJ473	47K	1
R120	ERJ3GEYF152	1.5K	1
R121	ERJ3GEYJ222	2.2K	1
R122	ERJ3GEYJ823	82K	1
R124	ERJ3GEYJ103	10K	1
R125	ERJ3GEYJ823	82K	1
R126	ERJ3GEYJ334	330K	1
R127	ERJ3GEYJ473	47K	1
R128	ERJ3GEYF123	12K	1
R129	ERJ3GEYJ222	2.2K	1
R130	ERJ3GEYJ683	68K	1
R131	ERJ3GEYJ102	1K	1
R132	ERJ3GEYJ273	27K	1
R134	ERJ3GEYJ473	47K	1
R135	ERJ3GEYJ223	22K	1
R136	ERJ3GEYJ223	22K	1
R137	ERJ3GEYJ682	6.8K	1
R138	ERJ3GEYJ822	8.2K	1
R140	ERJ3GEYJ153	15K	1
R141	ERJ3GEYJ103	10K	1
R142	ERJ3GEYJ683	68K	1
R143	ERDS2TJ100	10	1
R145	ERJ3GEYJ154	150K	1
R146	ERJ3GEYJ104	100K	1
R147	ERJ3GEYJ124	120K	1
R148	ERJ3GEYJ104	100K	1
R149	ERJ3GEYJ472	4.7K	1
R150	ERJ3GEYJ104	100K	1
R152	ERJ3GEYJ103	10K	1
R153	ERJ3GEYJ104	100K	1
R154	ERJ3GEYJ123	12K	1
R155	ERJ3GEYJ104	100K	1
R156	ERJ3GEYJ564	560K	1
R157	ERJ3GEYJ823	82K	1
R158	ERJ3GEYJ104	100K	1
R159	ERDS2TJ221	220	1
R160	PQ4R10XJ221	220	1

This replacement parts list is U.S.A. version only. Refer to the simplified manual (cover) for other areas.

Ref. No.	Part No.	Value	Pcs/Set
R161	PQ4R18XJ333	33K	1
R162	ERJ3GEYJ123	12K	1
R163	PQ4R10XJ222	2.2K	1
R164	ERDS2TJ104	100K ⚠	1
R165	ERDS2TJ472	4.7K ⚠	1
R166	PQ4R10XJ563	56K ⚠	1
R167	PQ4R10XJ153	15K ⚠	1
R168	PQ4R10XJ682	6.8K ⚠	1
R169	PQ4R10XJ682	6.8K ⚠	1
R170	ERDS2TJ560	56 ⚠	1
R173	ERJ3GEYJ103	10K	1
R174	ERJ3GEYJ472	4.7K	1
R175	ERJ3GEYJ472	4.7K	1
R177	ERJ3GEYJ682	6.8K	1
R180	ERJ3GEYJ563	56K	1
R181	ERJ3GEYJ473	47K	1
R182	ERJ3GEYJ155	1.5M	1
R184	ERJ3GEYJ684	680K	1
R185	ERJ3GEYJ101	100	1
R186	ERJ3GEYJ222	2.2K	1
R187	ERDS2TJ473	47K ⚠	1
R188	ERJ3GEYJ332	3.3K	1
R189	PQ4R10XJ561	560	1
R190	ERJ3GEYJ333	33K	1
R194	ERJ3GEYJ333	33K	1
R195	ERJ3GEYJ333	33K	1
R196	ERJ3GEYJ333	33K	1
R197	ERJ3GEYJ333	33K	1
R207	ERJ3GEYJ222	2.2K	1
R208	ERJ3GEYJ272	2.7K	1
R209	ERJ3GEYJ223	22K	1
R214	ERJ3GEYJ104	100K	1
R215	ERJ3GEYJ474	470K	1
R216	ERJ3GEYJ394	390K	1
R217	ERJ3GEYJ224	220K	1
R218	ERJ3GEYJ473	47K	1
R219	ERJ3GEYJ334	330K	1
R220	ERJ3GEYJ334	330K	1
R221	ERJ3GEYJ105	1M	1
R222	ERJ3GEYJ392	3.9K	1
R223	ERJ3GEYJ272	2.7K	1
R224	ERJ3GEYF472	4.7K	1
R225	ERJ3GEYF272	2.7K	1
R226	ERJ3GEYF222	2.2K	1
R227	ERJ3GEYJ105	1M	1
R230	ERJ3GEYJ106	10M	1
R250	ERDS1TJ472	4.7K	1
R251	ERDS1TJ472	4.7K	1
R301	ERJ3GEYJ223	22K	1
R302	ERJ3GEYJ223	22K	1
R303	ERJ3GEYJ223	22K	1
R304	PQ4R10XJ681	680	1
R305	PQ4R10XJ331	330	1
R306	PQ4R10XJ821	820	1
R307	PQ4R10XJ102	1K	1
R308	ERJ3GEYJ223	22K	1
R309	ERJ3GEYJ104	100K	1
R310	ERJ3GEYJ104	100K	1
R311	ERJ3GEYJ104	100K	1
R312	ERJ3GEYJ104	100K	1
R313	ERJ3GEYJ473	47K	1
R314	ERJ3GEYJ104	100K	1
R315	ERJ3GEYJ223	22K	1
R316	PQ4R10XJ102	1K	1
R403	ERJ3GEYJ332	3.3K	1
R404	ERJ3GEYJ103	10K	1
R405	ERJ3GEYJ563	56K	1
R406	ERJ3GEYJ823	82K	1
R407	ERJ3GEYJ471	470	1
R409	ERJ3GEYJ105	1M	1
R410	ERJ3GEYJ154	150K	1

Ref. No.	Part No.	Value	Pcs/Set
R411	ERJ3GEYJ154	150K	1
R412	ERJ3GEYJ333	33K	1
R413	ERJ3GEYJ563	56K	1
R414	ERJ3GEYJ103	10K	1
R415	ERJ3GEYJ123	12K	1
R416	PQ4R18XJ223	22K	1
R418	ERJ3GEYJ333	33K	1
R419	ERJ3GEYJ333	33K	1
R420	ERJ3GEYJ472	4.7K	1
R422	ERJ3GEYJ153	15K	1
R423	ERJ3GEYJ153	15K	1
R424	ERJ3GEYJ563	56K	1
R425	ERJ3GEYJ472	4.7K	1
R428	ERJ3GEYJ474	470K	1
R429	ERJ3GEYJ474	470K	1
R430	ERJ3GEYJ683	68K	1
R431	ERJ3GEYJ683	68K	1
R432	ERJ3GEYJ564	560K	1
R433	ERJ3GEYJ394	390K	1
R434	ERJ3GEYJ393	39K	1
R435	ERJ3GEYJ183	18K	1
R436	ERJ3GEYJ104	100K	1
R437	ERJ3GEYJ124	120K	1
R438	PQ4R10XJ220	22	1
R439	ERJ3GEYJ123	12K	1
R440	ERDS1TJ270	27	1
R441	ERDS1TJ330	33	1
R442	ERJ3GEYJ000	0	1
R443	ERJ3GEYJ332	3.3K	1
R444	ERJ3GEYJ104	100K	1
R445	PQ4R18XJ472	4.7K	1
R446	PQ4R18XJ472	4.7K	1
R447	ERDS1TJ560	56	1
R448	ERDS1TJ470	47	1
R449	PQ4R18XJ332	3.3K	1
R450	ERDS2TJ101	100	1
R451	ERDS2TJ121	120	1
R460	ERJ3GEYJ274	270K	1
R461	ERJ3GEYJ104	100K	1
R462	ERJ3GEYJ104	100K	1
R463	ERJ3GEYJ104	100K	1
R501	PQ4R10XJ820	82	1
R502	ERJ3GEYJ102	1K	1
R503	ERJ3GEYJ272	2.7K	1
R504	ERJ3GEYJ394	390K	1
R506	ERDS1TJ330	33 ⚠ S	1
R507	PQ4R10XJ680	68 ⚠	1
R508	PQ4R10XJ101	100 ⚠	1
R509	PQ4R10XJ821	820	1
R510	PQ4R10XJ333	33K ⚠	1
R511	PQ4R10XJ102	1K ⚠	1
R512	PQ4R10XJ123	12K ⚠	1
R513	ERJ3GEYJ333	33K	1
R514	ERJ3GEYJ823	82K	1
R515	ERJ3GEYJ473	47K	1
J1~5	ERJ3GEYJ000	0	5
J7~14	ERJ3GEYJ000	0	8
J17~22	ERJ3GEYJ000	0	6
J50~54	PQ4R18XJ000	0	5
J60~65	ERJ3GEYJ000	0	6
J74~77	ERJ3GEYJ000	0	4
J79~88	ERJ3GEYJ000	0	10
J90	PQ4R18XJ000	0	1
J98	ERJ3GEYJ000	0	1
J302~J304	1SS119	DIODE(SI)	3

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Ref. No.	Part No.	Value		Pcs/Set
		(CAPACITORS)		
C50	PQCUV1E104MD	0.1	S	1
C51	PQCUV1E104MD	0.1	S	1
C54	PQCUV1E104MD	0.1	S	1
C83	PQCUV1H102J	0.001	S	1
C84	ECUV1H101JC	100P		1
C90	PQCUV1H103KB	0.01	S	1
C91	PQCUV1H222KB	0.0022	S	1
C92	PQCUV1E104MD	0.1	S	1
C93	PQCUV1H471JC	470P	S	1
C94	PQCUV1C224ZF	0.22		1
C95	PQCUV1E104MD	0.1	S	1
C101	PQCUV1H103KB	0.01		1
C102	PQCUV1E104MD	0.1	S	1
C103	ECEA1CU221	220		1
C104	ECEA1CU331	330		1
C105	PQCUV1E104MD	0.1	S	1
C107	PQCUV1H102J	0.001	S	1
C108	PQCUV1H103KB	0.01	S	1
C109	PQCUV1H103KB	0.01	S	1
C111	ECEA1AU221	220	S	1
C113	PQCUV1H223MD	0.022		1
C114	PQCUV1H223MD	0.022		1
C115	PQCUV1H222KB	0.0022	S	1
C116	ECEA0JKS220	22	S	1
C117	PQCUV1H471JC	470P	S	1
C118	ECEA0JK221	220	S	1
C119	ECEA0JU102	1000		1
C120	PQCUV1H103KB	0.01	S	1
C121	ECEA1CKS470	47	S	1
C122	ECUV1H103KBV	0.01		1
C124	PQCUV1E104MD	0.1	S	1
C125	PQCUV1H123MD	0.012		1
C126	PQCUV1H222KB	0.0022	S	1
C128	PQCUV1H223MD	0.022		1
C129	PQCUV1E104MD	0.1	S	1
C130	PQCUV1H683MD	0.068		1
C131	PQCUV1H123MD	0.012	S	1
C132	PQCUV1E104MD	0.1	S	1
C134	PQCUV1H473MD	0.047		1
C135	PQCUV1H103KB	0.01	S	1
C136	PQCUV1H332KB	0.0033	S	1
C138	PQCUV1E104MD	0.1	S	1
C139	PQCUV1E104MD	0.1	S	1
C140	PQCUV1H223MD	0.022		1
C141	ECQE2E224JZ	0.22	⚠ S	1
C142	ECKD2H681KB	680P	⚠ S	1
C143	ECKD2H681KB	680P	⚠ S	1
C144	PQCUV1H153KB	0.015		1
C147	ECEA1HKS2R2	2.2	⚠ S	1
C148	ECEA1CU221	220	⚠	1
C149	ECEA1AU221	220		1
C150	PQCUV1E104MD	0.1	S	1
C152	PQCUV1E104MD	0.1	S	1
C153	PQCUV1H123MD	0.012		1
C154	ECEA1AU102	1000		1
C155	ECUV1H681JCV	680P	S	1
C156	PQCUV1E333MD	0.033		1
C157	ECUV1H681JCV	680P	S	1
C158	ECUV1H272KBV	0.0027	S	1
C159	PQCUV1H103KB	0.01	S	1
C160	PQCUV1E104MD	0.1	S	1
C161	PQCUV1H103KB	0.01	⚠ S	1
C162	PQCUV1H271JC	270P		1
C164	ECEA1CKS100	10	S	1
C167	PQCUV1H103KB	0.01	⚠ S	1
C184	PQCUV1H101JC	100P		1
C185	PQCUV1E104MD	0.1	S	1
C201	PQCUV1H180JC	18P		1
C202	PQCUV1H180JC	18P		1
C203	ECUV1H100DCV	10P		1
C204	ECUV1H100DCV	10P		1
C205	PQCUV1H333JC	0.033	S	1
C206	PQCUV1C334ZF	0.33		1
C207	EECW5R5D473	0.047	S	1
C233	PQCUV1H333JC	0.033	S	1
C240	PQCUV1E104MD	0.1	S	1
C301	PQCUV1E104MD	0.1	S	1
C302	PQCUV1E104MD	0.1	S	1
C303	ECST1AX106	10		1
C401	PQCUV1C474ZF	0.47		1
C402	PQ4R10XJ223	22K		1
C403	PQCUV1E104MD	0.1	S	1
C404	PQCUV1C105ZF	1		1
C405	ECST0JX226	22		1
C406	PQCUV1C105ZF	1		1
C407	PQCUV1C105ZF	1		1
C408	ECST0JY475	4.7		1
C409	ECST1AX106	10		1
C410	PQCUV1E104MD	0.1	S	1
C411	PQCUV1H151JC	150P		1
C412	PQCUV1C105ZF	1		1
C413	PQCUV1H123MD	0.012	S	1
C416	PQCUV1H682KB	0.0068	S	1
C417	ECST1AX106	10		1
C418	ECST0JY475	4.7		1
C419	PQCUV1H153KB	0.015		1
C420	ECUV1H224ZF	0.22	S	1
C421	ECST1CY105	1		1
C422	ECST1CY225	2.2		1
C423	PQCUV1H561JC	560P	S	1
C425	PQCUV1H473MD	0.047	S	1
C427	PQCUV1H331JC	330P	S	1
C429	PQCUV1E104MD	0.1	S	1
C430	PQCUV1H222KB	0.0022	S	1
C431	ECST1AX226	22		1
C432	PQCUV1H333JC	0.033	S	1
C433	PQCUV1H391JC	390P	S	1
C434	PQCUV1H272KB	0.0027		1
C435	ECUV1H103KB	0.01	S	1
C436	ECUV1H103KB	0.01	S	1
C441	ECEA1CKS220	22	S	1
C460	PQCUV1E683KB	0.068		1
C462	PQCUV1E473MD	0.047	S	1
C463	PQCUV1H561JC	560P	S	1
C502	PQCUV1E104MD	0.1	S	1
C503	ECEA1CKS220	22	⚠ S	1
C504	ECEA1EK470	47	⚠ S	1
C505	PQCUV1H333JC	0.033	⚠ S	1
C506	ECEA1CKS100	10	⚠ S	1
C507	ECST1AX226	22	⚠	1
C508	PQCUV1H101JC	100P	⚠	1
C509	PQCUV1H271JC	270P	⚠ S	1
C510	PQCUV1E104MD	0.1	S	1
C550	ECKWKC472MF	0.0047	⚠	1
		RF UNIT PARTS		
PCB2	PQLP10179M	P.C.BOARD ASS'Y (RTL)		1
		(ICS)		
IC301	PQVIM64084AG	IC		1
IC302	PQVIDBL5018V	IC		1
		(TRANSISTORS)		
Q301	2SC4571R77	TRANSISTOR(SI)	S	1
Q302	2SC4571R77	TRANSISTOR(SI)	S	1
Q303	2SC4226R24	TRANSISTOR(SI)		1
Q304	2SC4226R24	TRANSISTOR(SI)		1

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Ref. No.	Part No.	Value		Pcs/Set
Q305	2SC4116	TRANSISTOR(SI)		1
Q308	2SD601A	TRANSISTOR(SI)		1
Q309	PQVTD123J106	TRANSISTOR(SI)		1
Q310	PQVTD123J106	TRANSISTOR(SI)		1
		(DIODES)		1
D301	MA728	DIODE(SI)		1
D302	MA728	DIODE(SI)		1
D303	MA110	DIODE(SI)		1
D304	MA110	DIODE(SI)		1
D305	MA2S111	DIODE(SI)		1
D306	MA110	DIODE(SI)		1
D310	MA8047	DIODE(SI)		1
C391	MA110	DIODE(SI)		1
		(COILS)		
L301	PQLQR1RM601	COIL		1
L302	PQLQR1RM601	COIL		1
L303	MQLRE10NJF	COIL		1
L304	PQLQR2N3R3KT	COIL		1
L305	PQLI2B201	COIL		1
L319	MQLRE10NJF	COIL		1
L322	PQLQR1RM601	COIL		1
R389	PQLQR1RM601	COIL		1
		(SAW FILTERS)		
FL301	PQVSM903C10L	SAW FILTER		1
FL302	PQVS705CE927	SAW FILTER		1
FL303	PQVFSFE107MJ	SAW FILTER	S	1
FL304	PQVFCFH450B1	SAW FILTER		1
		(OTHERS)		
RX VCO	PQV030Z	CRYSTAL OSCILLATOR		1
TX VCO	PQV031Z	CRYSTAL OSCILLATOR		1
VC301	ECRLA010A53R	TRIMMER CAPACITOR		1
VR301	EVN5ESX50B54	VARIABLE RESISTOR		1
X301	PQVCJ1025N0Z	CRYSTAL OSCILLATOR		1
CN301	PQJS12A99Z	CONNECTOR		1
		(RESISTORS)		
R301	ERJ3GEYJ333	33K		1
R302	ERJ3GEYJ470	47		1
R303	ERJ3GEYJ101	100		1
R304	ERJ3GEYJ333	33K		1
R305	ERJ3GEYJ821	820		1
R306	ERJ3GEYJ681	680		1
R307	ERJ3GEYJ223	22K		1
R308	ERJ3GEYJ153	15K		1
R309	ERJ3GEYJ153	15K		1
R310	ERJ3GEYJ222	2.2K		1
R311	ERJ3GEYJ223	22K		1
R312	ERJ3GEYJ223	22K		1
R313	ERJ3GEYJ470	47		1
R314	ERJ3GEYJ470	47		1
R315	ERJ3GEYJ681	680		1
R316	ERJ3GEYJ153	15K		1
R317	ERJ3GEYJ153	15K		1
R318	ERJ3GEYJ223	22K		1
R319	ERJ3GEYJ474	470K		1
R320	ERJ3GEYJ470	47		1
R321	ERJ3GEYJ391	390		1
R323	ERJ3GEYJ474	470K		1
R324	ERJ3GEYJ102	1K		1
R325	ERJ3GEYJ104	100K		1
R327	ERJ3GEYJ824	820K		1
R328	ERJ3GEYJ472	4.7K		1

Ref. No.	Part No.	Part Name & Description		Pcs/Set
R329	ERJ3GEYJ334	330K		1
R330	ERJ3GEYJ154	150K		1
R331	ERJ3GEYJ821	820		1
R332	ERJ3GEYJ102	1K		1
R334	ERJ3GEYJ222	2.2K		1
R335	ERJ3GEYJ222	2.2K		1
R336	ERJ3GEYJ103	10K		1
R337	ERJ3GEYJ220	22		1
R338	ERJ3GEYJ222	2.2K		1
R339	ERJ3GEYJ222	2.2K		1
R340	ERJ3GEYJ222	2.2K		1
R342	ERJ3GEYJ101	100		1
R350	ERJ3GEYJ821	820		1
R353	ERJ3GEYJ222	2.2K		1
R356	ERJ3GEYJ000	0		1
R357	ERJ3GEYJ392	3.9K		1
R358	ERJ3GEYJ222	2.2K		1
R359	ERJ3GEYJ680	68		1
R360	ECUV1H040CCV	4P		1
R361	ERJ3GEYJ000	0		1
R362	ERJ3GEYJ680	68		1
L306	ERJ3GEYJ000	0		1
L317	ERJ3GEYJ120	12		1
L318	ERJ3GEYJ220	22		1
C312	ERJ3GEYJ470	47		1
C394	ERJ3GEYJ000	0		1
C630	ERJ3GEYJ470	47		1
C632	ERJ3GEYJ000	0		1
		(CAPACITORS)		
C302	ECUV1H0R5CCV	0.5P		1
C303	ECUV1H050CCV	5P		1
C304	ECUV1H102KBV	0.001		1
C305	ECUV1H020CCV	2P		1
C306	ECUV1H102KBV	0.001		1
C308	ECUV1H030CCV	3P		1
C309	ECUV1H030CCV	3P		1
C310	ECEA1CKS470	47	S	1
C311	ECUV1H102KBV	0.001		1
C313	PQCUV1C224KB	0.22		1
C314	ECUV1H682KBV	0.0068		1
C315	ECUV1H332KBV	0.0033		1
C317	ECUV1H820JCV	82P		1
C318	ECUV1H430JCV	43P		1
C319	ECUV1H080DCV	8P		1
C320	ECUV1H103KBV	0.01		1
C321	ECUV1H020CCV	2P		1
C322	ECUV1H030CCV	3P		1
C323	ECUV1H102KBV	0.001		1
C324	ECUV1H102KBV	0.001		1
C325	ECUV1H102KBV	0.001		1
C327	ECUV1H102KBV	0.001		1
C328	ECUV1H060DCV	6P		1
C329	ECUV1H040CCV	4P		1
C330	ECUV1H103KBV	0.01		1
C331	ECEA1CKS470	47	S	1
C333	ECUV1H223KBV	0.022	S	1
C334	PQCUV1C224KB	0.22		1
C336	ECUV1H680JCV	68P		1
C337	ECUV1H103KBV	0.01		1
C338	ECUV1H220JCV	22P		1
C339	PQCUV1C224ZF	0.22	S	1
C340	ECUV1H101JCV	100P		1
C341	ECUV1H333KDV	0.033	S	1
C342	ECUV1H102KBV	0.001		1
C343	ECUV1H102KBV	0.001		1
C345	ECUV1H472KBV	0.0047		1
C346	ECUV1H020CCV	2P		1
C348	ECUV1H103KBV	0.01		1

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This replacement parts list is U.S.A. version only. Refer to the simplified manual (cover) for other areas.

Ref. No.	Part No.	Value	Pcs/Set
C349	ECUV1H103KBV	0.01	1
C350	ECUV1H103KBV	0.01	1
C351	PQCUV1C105ZF	1	1
C352	ECUV1H103KBV	0.01	1
C354	ECUV1H030CCV	3P	1
C376	ECUV1H102KBV	0.001	1
C380	ECST0JX226	22	1
C381	ECUV1H1R5CCV	1.5P	1
C383	ECUV1H020CCV	2P	1
C385	ECUV1H101JCV	100P	1
C386	ECUV1H102KBV	0.001	1
C387	ECUV1H102KBV	0.001	1
C388	ECUV1H101JCV	100P	1
C389	ECUV1H020CCV	2P	1
C390	ECUV1H020CCV	2P	1
C392	ECUV1H102KBV	0.001	1
C393	ECUV1H103KBV	0.01	1
C395	ECEA1CKS100	10 S	1
C398	ECUV1H101JCV	100P	1
C399	ECUV1A105ZFV	1	1
C600	ECUV1H101JCV	100P	1
C601	ECUV1H101JCV	100P	1
C602	ECUV1H101JCV	100P	1
C603	ECUV1H101JCV	100P	1
C604	ECUV1H101JCV	100P	1
C605	ECUV1H101JCV	100P	1
C606	ECUV1H101JCV	100P	1
C607	ECUV1H101JCV	100P	1
C608	ECUV1H101JCV	100P	1
C610	ECUV1H101JCV	100P	1
C611	ECUV1H101JCV	100P	1
C612	ECUV1H101JCV	100P	1
C613	ECUV1H101JCV	100P	1
C615	ECUV1H101JCV	100P	1
C616	ECUV1H101JCV	100P	1
C617	ECUV1H101JCV	100P	1
C618	ECUV1H101JCV	100P	1
C620	ECUV1H101JCV	100P	1
C621	ECUV1H101JCV	100P	1
C622	ECUV1H101JCV	100P	1
C623	ECUV1H101JCV	100P	1
C624	ECUV1H101JCV	100P	1
C625	ECUV1H101JCV	100P	1
		DSP UNIT PARTS	
PCB3	PQLP10180M	P.C.BOARD ASS'Y (RTL)	1
		(ICS)	
IC701	PQVID6471A	IC	1
IC702	PQVIKM29N4TC	IC	1
IC703	PQVIMS7533HK	IC	1
		(COIL)	
L701	PQLQR1ET	COIL	1
		(CRYSTAL OSCILLATOR)	
X701	PQVCJ3686N4Z	CRYSTAL OSCILLATOR	1
		(CONNECTORS)	
CN701	PQJS14A56Y	CONNECTOR	1
CN702	PQJS11A56Y	CONNECTOR	1

Ref. No.	Part No.	Value	Pcs/Set
		(RESISTORS)	
R701	ERJ3GEYJ105	1M	1
R702	ERJ3GEYJ681	680	1
R703	ERJ3GEYJ103	10K	1
R704	ERJ3GEYJ103	10K	1
R705	ERJ3GEYJ103	10K	1
R706	ERJ3GEYJ103	10K	1
R707	ERJ3GEYJ472	4.7K	1
R708	ERJ3GEYJ472	4.7K	1
R750	ERJ3GEYJ221	220	1
R751	ERJ3GEYJ221	220	1
R752	ERJ3GEYJ221	220	1
R753	ERJ3GEYJ221	220	1
R754	ERJ3GEYJ221	220	1
R755	ERJ3GEYJ221	220	1
R756	ERJ3GEYJ221	220	1
R757	ERJ3GEYJ221	220	1
R758	ERJ3GEYJ221	220	1
R759	ERJ3GEYJ221	220	1
R760	ERJ3GEYJ221	220	1
R761	ERJ3GEYJ221	220	1
R762	ERJ3GEYJ221	220	1
R763	ERJ3GEYJ221	220	1
		(CAPACITORS)	
C701	ECUV1E104ZFV	0.1	1
C702	ECUV1E104ZFV	0.1	1
C703	ECUV1E104ZFV	0.1	1
C704	ECUV1E104ZFV	0.1	1
C705	ECUV1H120JCV	12P	1
C706	ECUV1H120JCV	12P	1
C708	ECUV1E104ZFV	0.1	1
C709	ECUV1E104ZFV	0.1	1
C710	ECUV1H102KBV	0.001	1
C711	ECUV1C104KBV	0.1	1
C712	ECUV1C104KBV	0.1	1
C713	ECUV1H101JCV	100P	1
C714	ECUV1H101JCV	100P	1
C750	ECUV1H470JCV	47P	1
C751	ECUV1H470JCV	47P	1
C752	ECUV1H470JCV	47P	1
C753	ECUV1H470JCV	47P	1
C754	ECUV1H470JCV	47P	1
C755	ECUV1H470JCV	47P	1
C756	ECUV1H470JCV	47P	1
C757	ECUV1H470JCV	47P	1
C758	ECUV1H470JCV	47P	1
C759	ECUV1H470JCV	47P	1
C760	ECUV1H470JCV	47P	1
C761	ECUV1H470JCV	47P	1
C762	ECUV1H470JCV	47P	1
C763	ECUV1H470JCV	47P	1

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REPLACEMENT PARTS LIST

Model KX-TCM940R-B

Note:

1. RTL (Retention Time Limited)
   The marking (RTL) indicates that the Retention Time is limited for this item. After the discontinuation of this assembly in production, the item will continue to be available for a specific period of time. The retention period of availability is dependent on the type of assembly, and in accordance with the laws governing part and product retention.
   After the end of this period, the assembly will no longer be available.
2. Important safety notice.
   Components identified by a ⚠ mark special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.
3. The S mark indicates service standard parts and may differ from production parts.
4. RESISTORS & CAPACITORS
   Unless otherwise specified.
   All resistors are in ohms (Ω) K=1000Ω, M=1000KΩ
   All capacitors are in MICRO FARADS (μF) P= μμF
   *Type &Wattage of Resistor
   Type

ERC:Solid	ERX:Metal Film	PQ4R:Carbon
ERD:Carbon	ERG:Metal Oxide	ERS:Fusible Resistor
PQRD:Carbon	ER0:Metal Film	ERF:Cement Resistor

Wattage

10,16:1/8W	14,25:1/4W	12:1/2W	1:1W	2:2W	3:3W

*Type & Voltage of Capacitor
Type

ECFD:Semi-Conductor	ECCD,ECKD,ECBT,PQCBC : Ceramic
ECQS:Styrol	ECQE,ECQV,ECQG : Polyester
PQCUV:Chip	ECEA,ECSZ : Electrolytic
ECQMS:Mica	ECQP : Polypropylene

Voltage

ECQ Type	ECQG ECQV Type	ECSZ Type	Others	
1H: 50V	05: 50V	0F:3.15V	0J :6.3V	1V :35V
2A:100V	1:100V	1A:10V	1A :10V	50,1H:50V
2E:250V	2:200V	1V:35V	1C :16V	1J :63V
2H:500V		0J:6.3V	1E,25:25V	2A :100V

Ref. No.	Part No.	Part Name & Description	Pcs/Set
		CABINET & ELECTRICAL PARTS	
101	PQYM10063V3	FRONT CABINET	1
102	PQKF10172Z1	CABINET COVER	1
103	PQAX2P04Z	SPEAKER	1
104	PQJT10112Z	CHARGE TERMINAL	3
105	PQJT10113Z	CHARGE TERMINAL	2
106	PQSA10048Z	ANTENNA	1
107	PQSX10043Z	KEYBOARD SWITCH	1
108	PQSX10045Y	KEYBOARD SWITCH	1
109	PQHR10486Z1	SP HOLDER	1
110	PQMC10217Z	SHIELD COVER	1
111	PQMC10218Z	SHIELD COVER	1
112	PQQT11236Y	LABEL	1
113	XTB26+8J	SCREW	2
114	XTW26+12F	SCREW	4
115	PQHS10293Z	COVER	1
116	PQHR10511Z	LED SPACER	1

Ref. No.	Part No.	Part Name & Description		Pcs/Set
		MAIN P.C.BOARD PARTS		
PCB100	PQWPTCM940BR	P.C.BOARD ASS'Y (RTL)		1
		(ICS)		
IC201	MN151233KZAC	IC		1
IC202	AN6165SB	IC		1
IC203	AN6183SAE1	IC	S	1
IC204	PQVIXCC3501P	IC		1
IC205	PQVIXC3002PR	IC		1
IC206	PQVIXCC3202P	IC		1
IC207	PQVIXC3002PR	IC		1
IC208	PQVINJM2113V	IC		1
IC401	PQVIM64084AG	IC		1
IC402	PQVIDBL5018V	IC		1
		(TRANSISTORS)		
Q201	2SD1819A	TRANSISTOR(SI)		1
Q202	2SD1819A	TRANSISTOR(SI)		1
Q203	PQVTDTB123E	TRANSISTOR(SI)		1
Q204	2SD1819A	TRANSISTOR(SI)		1
Q205	PQVTDTA143EU	TRANSISTOR(SI)		1
Q206	PQVTDTB123E	TRANSISTOR(SI)		1
Q208	2SD1819A	TRANSISTOR(SI)		1
Q209	PQVTDTC143E	TRANSISTOR(SI)		1
Q212	PQVTD123T146	TRANSISTOR(SI)	S	1
Q213	PQVTD123J106	TRANSISTOR(SI)	S	1
Q214	2SD1819A	TRANSISTOR(SI)		1
Q215	2SD1819A	TRANSISTOR(SI)		1
Q217	PQVTDTC144TU	TRANSISTOR(SI)		1
Q230	PQVTDTC143E	TRANSISTOR(SI)		1
Q401	2SC4571R77	TRANSISTOR(SI)	S	1
Q402	2SC4571R77	TRANSISTOR(SI)	S	1
Q403	2SC4226R24	TRANSISTOR(SI)		1
Q404	2SC4227R34	TRANSISTOR(SI)		1
Q405	2SC4116	TRANSISTOR(SI)		1
		(DIODES)		
D201	MA110	DIODE(SI)		1
D202	PQVDRB751H4	DIODE(SI)		1
D205	PQVDBR1112H	LED		1
D206	PQVDPY1112H	LED		1
D207	PQVDPY1112H	LED		1
D208	PQVDPY1112H	LED		1
D209	PQVDPY1112H	LED		1
D210	PQVDPY1112H	LED		1
D212	PQVDBR1112H	LED		1
D213	MA110	DIODE(SI)		1
D214	MA3062	DIODE(SI)		1
D215	MA110	DIODE(SI)		1
D217	MA110	DIODE(SI)		1
D401	PQVDRB751H4	DIODE(SI)		1
D402	PQVDRB751H4	DIODE(SI)		1
D403	MA110	DIODE(SI)		1
		(COILS)		
L201	PQLQR3ER10K	COIL		1
L202	PQLQR3ER10K	COIL		1
L203	PQLQR3ER10K	COIL		1
L400	PQLQR1RM601	COIL		1
L401	PQLQR1RM601	COIL		1
L402	PQLQR1RM601	COIL		1
L404	PQLQR2N3R3K	COIL		1
L405	PQLI2B201	COIL		1
L406	MQLRE2N7DF	COIL		1
L413	PQLQR1RM601	COIL		1
L414	PQLQR1RM601	COIL		1

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Ref. No.	Part No.	Part Name & Description	Pcs/Set
L415	PQLQR1RM601	COIL	1
L416	PQLQR1RM601	COIL	1
L417	PQLQR1RM601	COIL	1
L418	PQLQR1RM601	COIL	1
L419	MQLRE6N8JF	COIL	1
L420	MQLRE10NJF	COIL	1
L421	MQLRE15NJF	COIL	1
L422	MQLRE6N8JF	COIL	1
		(SAW FILTERS)	
FL401	PQVSM927C11L	SAW FILTER	1
FL402	PQVS705CF903	SAW FILTER	1
FL403	PQVFSFE107MJ	SAW FILTER S	1
FL404	PQVFCFH450B1	SAW FILTER	1
		(VARIABLE RESISTORS)	
VR201	EVN5ESX50B15	VARIABLE RESISTOR	1
VR202	EVN5ESX50B54	VARIABLE RESISTOR	1
VR203	EVN5ESX50B52	VARIABLE RESISTOR	1
VR401	EVN5ESX50B54	VARIABLE RESISTOR	1
		(CRYSTAL OSCILLATORS)	
X201	PQVBTCC3.99M	CRYSTAL OSCILLATOR	1
X202	PQVCE3276N9Z	CRYSTAL OSCILLATOR	1
X401	PQVCJ1025N0Z	CRYSTAL OSCILLATOR	1
		(OTHERS)	
TXVCO	PQV033Z	CRYSTAL OSCILLATOR	1
RX VCO	PQV032Z	CRYSTAL OSCILLATOR	1
VC401	ECRLA010A53R	TRIMMER CAPACITOR	1
E100	PQEFBDB111GP	BUZZER	1
E101	PQJM122Z	MICROPHONE	1
		(RESISTORS)	
R201	ERJ3GEYJ103	10K	1
R202	ERJ3GEYJ332	3.3K	1
R203	ERJ3GEYJ473	47K	1
R205	ERJ3GEYJ473	47K	1
R206	ERJ3GEYJ473	47K	1
R207	ERJ3GEYJ473	47K	1
R208	ERJ3GEYJ224	220K	1
R209	ERJ3GEYJ473	47K	1
R210	ERJ3GEYJ681	680	1
R211	ERJ3GEYJ222	2.2K	1
R212	ERJ3GEYJ103	10K	1
R213	ERJ3GEYJ103	10K	1
R214	ERJ3GEYJ222	2.2K	1
R215	ERJ3GEYJ274	270K	1
R216	ERJ3GEYJ472	4.7K	1
R218	ERJ3GEY0R00	0	1
R219	ERJ3GEYJ124	120K	1
R220	ERJ3GEYJ104	100K	1
R221	ERJ3GEYJ683	68K	1
R222	ERJ3GEYJ104	100K	1
R223	ERJ3GEYJ153	15K	1
R224	ERJ3GEYJ153	15K	1
R225	ERJ3GEYJ683	68K	1
R226	ERJ3GEYJ104	100K	1
R227	ERJ3GEYJ273	27K	1
R228	ERJ3GEYJ273	27K	1
R229	ERJ3GEYJ473	47K	1
R230	ERJ3GEY0R00	0	1
R231	ERJ3GEYJ123	12K	1
R232	ERJ3GEYJ472	4.7K	1
R233	ERJ3GEYJ823	82K	1
R234	ERJ3GEYJ563	56K	1

Ref. No.	Part No.	Value	Pcs/Set
R235	ERJ3GEYJ823	82K	1
R236	ERJ3GEY0R00	0	1
R237	ERJ3GEYJ101	100	1
R239	ERJ3GEYJ823	82K	1
R240	ERJ3GEYJ393	39K	1
R241	ERJ3GEYJ105	1M	1
R243	ERJ3GEYJ333	33K	1
R245	ERJ3GEYJ100	10	1
R246	ERJ3GEYJ124	120K	1
R247	ERJ3GEYJ223	22K	1
R248	ERJ3GEYJ223	22K	1
R249	ERJ3GEYJ103	10K	1
R250	ERJ3GEYJ124	120K	1
R251	ERJ3GEYJ103	10K	1
R252	ERJ3GEYJ100	10	1
R253	ERJ3GEYJ221	220	1
R254	ERJ3GEYJ562	5.6K	1
R255	ERJ3GEYJ153	15K	1
R256	ERJ3GEYJ102	1K	1
R257	ERJ3GEYJ474	470K	1
R258	ERJ3GEYJ823	82K	1
R259	ERJ3GEYJ563	56K	1
R260	ERJ3GEYJ472	4.7K	1
R264	ERJ3GEYJ101	100	1
R265	ERJ3GEYJ103	10K	1
R273	ERJ3GEYJ394	390K	1
R280	ERJ3GEYJ271	270	1
R282	ERJ3GEYJ224	220K	1
R283	ERJ3GEYJ103	10K	1
R286	ERJ3GEYJ331	330	1
R288	ERJ3GEY0R00	0	1
R289	ERJ3GEYJ473	47K	1
R290	ERJ3GEYJ273	27K	1
R291	ERJ3GEYJ100	10	1
R294	ERJ3GEYJ102	1K	1
R296	ERJ3GEYJ152	1.5K	1
R297	ERJ3GEYJ331	330	1
R298	ERJ3GEYJ331	330	1
R299	ERJ3GEYJ331	330	1
R300	ERJ3GEYJ331	330	1
R303	ERJ3GEYJ391	390	1
R306	ERJ3GEYJ333	33K	1
R307	ERJ3GEYJ222	2.2K	1
R308	ERJ3GEYJ103	10K	1
R401	ERJ3GEYJ223	22K	1
R402	ERJ3GEYJ470	47	1
R403	ERJ3GEYJ101	100	1
R404	ERJ3GEYJ333	33K	1
R405	ERJ3GEYJ821	820	1
R406	ERJ3GEYJ681	680	1
R407	ERJ3GEYJ153	15K	1
R408	ERJ3GEYJ153	15K	1
R409	ERJ3GEYJ153	15K	1
R410	ERJ3GEYJ222	2.2K	1
R411	ERJ3GEYJ183	18K	1
R412	ERJ3GEYJ183	18K	1
R413	ERJ3GEYJ470	47	1
R414	ERJ3GEYJ470	47	1
R415	ERJ3GEYJ681	680	1
R416	ERJ3GEYJ153	15K	1
R417	ERJ3GEYJ153	15K	1
R418	ERJ3GEYJ223	22K	1
R419	ERJ3GEYJ104	100K	1
R420	ERJ3GEYJ470	47	1
R421	ERJ3GEYJ101	100	1
R423	ERJ3GEYJ474	470K	1
R424	ERJ3GEYJ152	1.5K	1
R425	ERJ3GEYJ104	100K	1
R427	ERJ3GEYJ564	560K	1
R428	ERJ3GEYJ472	4.7K	1
R429	ERJ3GEYJ334	330K	1

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Ref. No.	Part No.	Value		Pcs/Set
R430	ERJ3GEYJ334	330K		1
R431	ERJ3GEYJ821	820		1
R432	ERJ3GEYJ102	1K		1
R434	ERJ3GEYJ222	2.2K		1
R435	ERJ3GEYJ222	2.2K		1
R436	ERJ3GEYJ123	12K		1
R437	ERJ3GEYJ220	22		1
R438	ERJ3GEYJ222	2.2K		1
R439	ERJ3GEYJ222	2.2K		1
R440	ERJ3GEYJ222	2.2K		1
R441	ERJ3GEYJ222	2.2K		1
R442	ERJ3GEYJ101	100		1
R453	ERJ3GEY0R00	0		1
R456	ERJ3GEY0R00	0		1
R457	ERJ3GEYJ822	8.2K		1
R458	ERJ3GEY0R00	0		1
R459	ERJ3GEYJ680	68		1
R460	ERJ3GEY0R00	0		1
R461	ECUV1H040CCV	4P		1
R462	ERJ3GEYJ680	68		1
J200	PQ4R18XJ000	0		1
J202	ERJ3GEY0R00	0		1
J203	ERJ3GEY0R00	0		1
J204	ERJ3GEY0R00	0		1
J205	ERJ3GEY0R00	0		1
J206	PQLQR2TR10K	COIL		1
J208	ERJ3GEY0R00	0		1
J209	ERJ3GEY0R00	0		1
J210	ERJ3GEY0R00	0		1
J211	ERJ3GEY0R00	0		1
J212	ERJ3GEY0R00	0		1
J213	ERJ3GEY0R00	0		1
J214	ERJ3GEY0R00	0		1
J215	ERJ3GEY0R00	0		1
		(CAPACITORS)		
C201	PQCUV1H103KB	0.01		1
C202	PQCUV1H103KB	0.01		1
C203	ECUV1H103KBV	0.01		1
C204	ECUV1H103KBV	0.01		1
C205	ECUV1H103KBV	0.01		1
C206	ECUV1C104KBV	0.1		1
C207	ECEA0JKA331	330		1
C208	ECEA1CKS100	10	S	1
C213	ECUV1H101JCV	100P		1
C214	ECUV1C104KBV	0.1		1
C215	ECUV1H391JCV	390P		1
C217	ECUV1C104ZFV	0.1		1
C218	ECUV1A105ZFV	1		1
C219	ECUV1C104ZFV	0.1		1
C220	ECUV1C104ZFV	0.1		1
C221	ECUV1H102KBV	0.001		1
C222	ECUV1H472KBV	0.0047		1
C223	ECEA1VKS4R7	4.7	S	1
C224	PQCUV1C105ZF	1		1
C225	ECUV1H223KBV	0.022	S	1
C226	ECUV1H472KBV	0.0047		1
C227	ECUV1H471JCV	470P		1
C228	ECEA1CKS100	10	S	1
C230	ECEA1CKS100	10	S	1
C231	ECEA1VKS4R7	4.7	S	1
C232	ECUV1C104ZFV	0.1		1
C233	ECUV1H822KBV	0.0082		1
C234	ECUV1A105ZFV	1		1
C235	ECUV1C104ZFV	0.1		1
C237	ECUV1H102KBV	0.001		1
C238	ECUV1C104KBV	0.1		1
C239	ECUV1A105ZFV	1		1

Ref. No.	Part No.	Value		Pcs/Set
C240	ECEA1CKS470	47	S	1
C241	ECUV1A105ZFV	1		1
C242	ECEA1CKS470	47	S	1
C243	ECUV1H103KBV	0.01		1
C244	ECUV1H182KBV	0.0018		1
C246	ECUV1C104KBV	0.1		1
C248	ECEA0JK221	220	S	1
C250	ECUV1C104KBV	0.1		1
C251	ECST0JX226	22		1
C252	ECUV1H180JCV	18P		1
C253	ECUV1H180JCV	18P		1
C254	ECUV1H104MD	0.1	S	1
C255	ECUV1C104KBV	0.1		1
C256	ECST0JX226	22		1
C258	ECUV1A105ZFV	1		1
C259	ECUV1C104KBV	0.1		1
C261	ECUV1C104ZFV	0.1		1
C262	ECUV1C104ZFV	0.1		1
C263	ECUV1C104ZFV	0.1		1
C264	ECUV1C104ZFV	0.1		1
C265	ECUV1C104ZFV	0.1		1
C266	ECUV1H182KBV	0.0018		1
C267	ECUV1C104ZFV	0.1		1
C402	ECUV1H0R5CCV	0.5P		1
C404	ECUV1H102KBV	0.001		1
C405	ECUV1H020CCV	2P		1
C406	ECUV1H102KBV	0.001		1
C407	ECUV1H040CCV	4P		1
C408	ECUV1H020CCV	2P		1
C409	ECUV1H1R5CCV	1.5P		1
C410	ECEA1CKS470	47	S	1
C411	ECUV1H103KBV	0.01		1
C412	ECUV1H040CCV	4P		1
C413	PQCUV1C224KB	0.22		1
C414	ECUV1H332KBV	0.0033		1
C415	ECUV1H332KBV	0.0033		1
C417	ECUV1H820JCV	82P		1
C418	ECUV1H430JCV	43P		1
C419	ECUV1H080DCV	8P		1
C420	ECUV1H103KBV	0.01		1
C422	ECUV1H030CCV	3P		1
C423	ECUV1H102KBV	0.001		1
C424	ECUV1H102KBV	0.001		1
C425	ECUV1H102KBV	0.001		1
C427	ECUV1H102KBV	0.001		1
C428	ECUV1H060DCV	6P		1
C429	ERJ3GEYJ470	47		1
C430	ECUV1H103KBV	0.01		1
C431	ECEA1CKS470	47	S	1
C432	ECUV1H562KBV	0.0056		1
C433	ECUV1H562KBV	0.0056		1
C434	PQCUV1C224KB	0.22		1
C436	ECUV1H680JCV	68P		1
C437	ECUV1H103KBV	0.01		1
C438	ECUV1H220JCV	22P		1
C439	PQCUV1E104MD	0.1	S	1
C440	ECUV1H680JCV	68P		1
C441	ECUV1H333KDV	0.033	S	1
C442	ECUV1H821KBV	820P		1
C443	ECUV1H821KBV	820P		1
C445	ECUV1H472KBV	0.0047		1
C446	ECUV1H020CCV	2P		1
C448	ECUV1C104KBV	0.1		1
C449	ECUV1H103KBV	0.01		1
C450	ECUV1C104KBV	0.1		1
C451	PQCUV1C105ZF	1		1
C452	ECUV1H103KBV	0.01		1
C476	ECUV1H102KBV	0.001		1
C482	ECUV1H0R5CCV	0.5P		1
C486	ECUV1H102KBV	0.001		1
C487	ECUV1H102KBV	0.001		1

KX-TCM940-B

This replacement parts list is U.S.A. version only. Refer to the simplified manual (cover) for other areas.

Ref. No.	Part No.	Value		Pcs/Set
C488	ECUV1H101JCV	100P		1
C489	ECUV1H010CCV	1P		1
C491	ECUV1H030CCV	3P		1
C492	ECUV1H102KBV	0.001		1
C494	ERJ3GEY0R00	0		1
C495	ECEA1CKS470	47	S	1
C498	ECUV1H101JCV	100P		1
C499	ECUV1H101JCV	100P		1
C500	ECUV1H101JCV	100P		1
C501	ECUV1H101JCV	100P		1
C502	ECUV1H101JCV	100P		1
C503	ECUV1H101JCV	100P		1
C504	ECUV1H101JCV	100P		1
C505	ECUV1H101JCV	100P		1
C506	ECUV1H101JCV	100P		1
C507	ECUV1H101JCV	100P		1
C508	ECUV1H101JCV	100P		1
C509	ECUV1H101JCV	100P		1
C510	ECUV1H101JCV	100P		1
C511	ECUV1H101JCV	100P		1
C512	ECUV1H101JCV	100P		1
C513	ECUV1H101JCV	100P		1
C517	ECUV1H101JCV	100P		1
C518	ECUV1H101JCV	100P		1
C525	ERJ3GEYJ470	47		1
C527	ERJ3GEY0R00	0		1

Ref. No.	Part No.	Part Name & Description	Pcs/Set
		KX-TCM940-B	
		ACCESSORIES	
A1	KX-A11-6	AC ADAPTOR ⚠	1
A2	PQJA59V	TEL CORD	1
A3	PQKK10065Z1	BATTERY COVER (for BASE UNIT)	1
A4	PQKK10066Z1	BATTERY COVER (for PORTABLE HANDSET)	1
A5	PQKL24Y0	WALL MOUNT BRACKET	1
A6	PQQT11232Z	INSTRUCTION LABEL	1
A7	PQQT11156Y	TEL CARD LABEL	1
A8	PQQW11677Z	QUICK REFERENCE GUIDE (ENGLISH)	1
A8	PQQW11678Z	QUICK REFERENCE GUIDE (SPANISH)	1
A9	PQQX11658Z	INSTRUCTION BOOK	1
		PACKING MATERIALS	
P1	PQPP170Z	BATTERY COVER (for BASE UNIT)	1
P2	XZB10X35A02	BATTERY COVER (for PORTABLE HANDSET)	1
P3	PQPN10553Z	CUSHION	1
P4	PQPN10554Z	ACCESSORY BOX	1
P5	PQPN10560Z	ACCESSORY BOX	1
P6	PQPK12180Z	GIFT BOX	1
		TOOLS	
Z1	PQZZ10K11Z	EXTENSION CORD, 10P	1
Z2	PQZZ14K8Z	EXTENSION CORD, 14P	1
			1

Note:
PQZZ10K11Z and PQZZ14K8Z are neccessity for servicing.